GROWING DEMAND FOR EMERGENCY DEPARTMENT SERVICES: ASSOCIATED FACTORS AND PERSPECTIVE OF PATIENTS

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Statement of Original Authorship

The work contained in this thesis has not been previously submitted to meet requirements for an award at this or any other higher education institution. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made.

Signature:

Date: 11 February 2015

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Publications and conference presentations arising from doctoral research

Publications

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Ghasem (Sam) Toloo, Gerry Fitzgerald, Peter Aitken, Joseph Ting, Kirsten McKenzie, **Joanna Rego**, "Ambulance use is associated with higher self-rated illness seriousness: user attitudes and perceptions." Academic Emergency Medicine (2013), Vol. 20, No 6.

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Conference presentations

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Joanna Rego, Gerry FitzGerald, Sam Toloo "Where do ED patients come from?"
An oral presentation of preliminary results 17th World Congress on Disaster and Emergency Medicine, Beijing, China 31 May – 3 June, 2011.

Sam Toloo, Gerry FitzGerald, **Joanna Rego** "Inequality in using emergency health services (EHS): Is it all about money?" Oral presentation Australian Sociological Association Conference, Newcastle 29 November – 1 December, 2011.

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Keywords

Demand,
Emergency Department Services,
Perspective of patients,
Reasons of patients,
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Factors,
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Abstract

Background and significance

Emergency departments play a unique role in every health care system as patients, in the event of an unexpected or urgent need, seek medical care through the services of these departments. In recent years, however, the utilisation of emergency departments has been growing rapidly around the world and in Australia. This trend appears to occur irrespective of the health care system settings existing in the particular country, population size, or its characteristics. The consequences of such a situation affect the safety of patients, their satisfaction, and the quality of care. These effects are not limited to individuals but impact also on health care resources including human, financial, and organisational resources. The consequences are also observed on stakeholders and can impact negatively back on community. A number of initiatives have been undertaken to date to reduce such demand on emergency departments but these have not met with much success.

Researchers across the globe have undertaken comprehensive studies to examine this situation and a number of factors have been found to contribute to the rising demand for emergency department services. Their impact, however, remains unknown and differs from one system to another. Moreover, the demand for emergency department services has not been specifically defined and there is a paucity of appropriate theoretical models for use in research conducted into emergency care settings.

In order to fill this void, this research project integrates existing health behaviour theories and develops a multidimensional model of emergency department service users. Based on such a model, the perspectives of patients and their reasons for accessing emergency department services in Queensland are examined.

Aims

The overall objective of this study is to identify factors associated with the increased demand for emergency department services in order to provide information for policy proposals that can lead to improved service delivery.

The aims were further subdivided into two studies with the following research objectives.

Study one aims to produce a profile of emergency department users, analyse and evaluate factors that influence the demand for emergency department services, and indentify any patterns with respect to provided services.

Study two identifies reasons for which patients present to emergency departments, analyse factors patients took into consideration when exercising their choice of location for seeking care, and identify the perspectives of users of emergency departments.

Methods

The research process involved two separate studies.

Study one used the emergency department data obtained from Queensland Health and extracted from a patient administration system known as the Emergency Department Information System (EDIS) for a period of eight years between 2003-04 and 2010-11 for the total of 31 hospitals across Queensland. Descriptive statistics were used to show the distribution, trends, patterns, and prevalence in use of emergency department services as well as user characteristics. Additionally, data collected for Study one was used to inform Study two in terms of sample size, selection of participating hospitals, and time of data collection.

A cross-sectional design was employed for Study two, utilising a self-completed questionnaire collected from patients in emergency departments. Two versions of questionnaires were used: one for adult patients and one for parents/guardians of underage patients. There was no previously developed or used questionnaire that could have been adapted for the current research project. The existing standard measures of the key constructs, or questions from prior studies were used where applicable. Additional scales and questions were developed and added to the questionnaire to measure all identified aspects of demand for emergency department services including reasons for use or general opinions about these services.

The data collection was performed in eight hospitals including four major city, two inter-regional and two outer-regional emergency departments. The sample size of the required 900 questionnaires was calculated and divided among participating emergency departments using the distribution of patients' presentations for the 2009-10 year from EDIS as a guide.

Results

The findings of Study one suggested that an increase in demand for emergency department services had been observed in all age groups with the oldest and the youngest patients recording the highest utilisation rates. In the majority of cases, males had higher utilisation rates than women for emergency department services in all age groups except the 20-29 age group, where women had exceeded men. An increase was also observed among more urgent triage categories and among patients who decided to seek care of their own initiative. Patients from lower socio-economic backgrounds and patients declaring that they hold only Medicare as their health insurance had higher utilisation rates of emergency departments than patients from other groups. The impact of other issues such as cultural backgrounds remains unclear. No differences were found between patients who were presenting to emergency departments during and outside of working hours. Also, little variation was observed with presentations according to months of the year. There was an increase in attendance during weekends and during day-time hours.

For Study two, a total of 911 questionnaires (687 adults and 224 parents/guardians) were collected during the data collection process. Results showed a satisfactory representation according to gender and age of the participants in the study sample. The response rate achieved was satisfactory, with 67% of questionnaires returned.

Analysis of data for Study two established some important findings. First, there were a number of factors that indicated a significant relationship between an actual or perceived health status of participants and their frequency of use and arrival method to the emergency departments. Second, affordability factors such as low income and being outside the workforce also highlighted a significant relationship between the number of times patients presented to the emergency department and the mode of transport they may have used. Third, a level of self-efficacy reported by participants played a significant role in decreasing the number of visits, not using the ambulance, and making their own decision as to where to seek care.

Finally results of multivariable regression models retained a smaller number of factors that made a unique contribution to the predictive models and varied for each of the outcome variables. The perception of patients' fair or poor health status underscored multiple uses of emergency departments. The contact made with somebody prior to coming together with a perception of the seriousness of a patient's

condition were predictive for choosing an ambulance rather than coming into emergency departments by their own transport. The presence of other people as well as contact with or the suggestion of others, increased the chances of a decision being made on behalf of patients. Higher self-efficacy levels, however, were the only factor that remained predictive of less frequent visits and self-transport to the emergency departments.

Conclusions

Four major conclusions can be drawn from the present study. Firstly, no evidence was found to support the view that inappropriate use causes a growth in demand for emergency department services. In fact, patients presenting to emergency departments were fully aware of alternative services, although they made their informed decision to seek care through the acute system based on the perception of their own health status and beliefs that emergency departments are the most suitable places to address their current health needs. Secondly, this study recognised that a growing and ageing population cannot be exclusively blamed for the growing demand, as utilisation rates are rising within all age groups and are high among paediatric patients. Further, no single group of patients was found to contribute significantly to the demand for emergency department services. Thirdly, some of the organisational issues pertaining to the availability of alternative services at certain points of time were linked and contributed to a higher amount of patients seeking care in emergency departments. Fourthly, the current study established that self-efficacy has been an important factor in individuals' ability to deal with unexpected events and in explaining the reasons behind presentations or avoidance of emergency departments. These findings strongly assert that the self-efficacy concept should be taken into account in future strategies aiming to reduce the utilisation of emergency department services.

The study findings indicate clearly that no single solution or strategy will effectively assist in the management of demand for services provided by the emergency department networks throughout Queensland. In fact, any proposed management policy ideas should bear in mind the complex and multi-factorial issues causing the current situation.

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List of Abbreviations

ABS	Australian Bureau of Statistics
ACEM	Australasian College for Emergency Medicine
ACEN	Australian College of Emergency Nursing
ACT	Australian Capital Territory
AIHW	Australian Institute of Health and Welfare
AIPC	Australian Institute for Primary Care
ARC	Australian Research Council
ATS	Australasian Triage Scale
ED	Emergency Department
EDIS	Emergency Department Information System
EHS	Emergency Health Services
EHSQ	Emergency Health Services Queensland Study
FTE	Full-time Equivalent
GP	General Practitioner
ICD	International Classification of Diseases (Version 9 and 10)
IRSAD	Index of Relative Socio-economic Advantage and Disadvantage
NNAPEDCD	National Non-Admitted Patients Emergency Department Care Database
NPHED	National Public Hospital Establishment Database
NSW	New South Wales
NT	Northern Territory
QH	Queensland Health
Qld	Queensland
SA	South Australia
SIFA	Socio-Economic Index for Areas
SPSS	Statistical Package for the Social Science
Tas	Tasmania
UR	Utilisation rate
USGAO	United States General Accounting Office
Vic	Victoria
WA	Western Australia

Chapter 1: Introduction

1.1 BACKGROUND TO RESEARCH

1.1.1 Public affairs and demand for emergency departments

The demand for emergency department services continues to attract the attention of governors, administrators, and scholars. This is due to the evidenced exponential growth, and the inadequacy of any solution proffered thus far to stem this disproportionate expansion and resolve the associated problems this intensification of demand has caused. This growth appears to occur irrespective of the health care system settings or population characteristics (Reeder et al., 2002; Weber et al., 2008, Smulowitz, O'Malley, Yang, & Landon, 2014, AIHW, 2014). Public anxiety and intense media attention have resulted in much international discussion by politicians, journalists, administrators, medical personnel, and scholars regarding the causes of the current situation, as discussed below.

The critical role of emergency departments as an integral component of any health care system makes them highly visible, frequently newsworthy, and potentially sensitive with regards to politics. In fact, there has been a noticeable increase in the policy and media focus on access to emergency departments and the quality of care provided to patients in recent years. Media across the country regularly report a magnitude of cases where patients experience difficulty or blocked access to emergency departments. In 2009, approximately fifty articles alone were written about emergency departments in Queensland (Courier Mail, 2010) and, as demonstrated in Figure 1.1, the rhetoric of journalists frequently communicate to the public a very negative, and sometimes even frightening picture for prospective patients.

Delays in treatment or hospital admission are the most frequent causes of news reports, but there are also more serious reasons for reporting in the media such as issues surrounding treatment quality and compromised patients outcomes (Kennedy, Trethewy, & Anderson, 2006).

Patients in overcrowded emergency departments are being forced to lie in waiting rooms, under television sets, in front of phone boxes and in entrance ways. *Sunday Mail, 22 November 2009*

Ambulances were turned away from hospitals hundreds of times in recent months because of critical bed shortages or overflowing emergency departments. *Liberal Victoria, 4 April 2010*

Patients dying in Queensland hospital emergency departments waiting for treatment. *The Courier Mail, 7 April 2011*

Some patients at Queensland emergency departments are waiting more than two days to be admitted to hospital, a study has found. *The Courier Mail, 6 September 2011*

Long emergency department delays leave patients in agony. *The Courier Mail, 30 August 2012*

A man died after spending more than four hours in an ambulance awaiting admission to a hospital, in the first confirmed death relating to the practice of "ramping". *The Courier Mail, 3 August 2012*

ACT emergency department patients still waiting longer. *ABC News, 18 October 2013*

Figure 1.1 News from media on emergency departments across Australia.

In recent years, there have been a number of strategies put in place to reduce the demand for emergency department services internationally and in Australia. Examples of this include an increase in the capacity of non-emergency department settings, such as the introduction of super clinics or out of hours care, patient's education and self management, telephone health advice, and patient's financial capacity particularly evident in the USA literature. Management strategies have also included recent public campaigns like those run by some of the state governments during winter 2013 under the slogan "Keep emergencies for emergency" or "Emergency departments are for emergencies". During these campaigns patients were advised that "...if you've got a cough or a cold and are thinking of heading to emergency, call your GP or contact *Healthdirect Australia* first" and appealing to patients to "...consider if your situation is a genuine emergency before coming to the emergency department" (ACT Government Health Directorate, 2013; Goverment of South Australia, 2013; Government of Western Australia, 2013; NSW Goverment,

2013). Despite all efforts, the effectiveness of these strategies varies and in some cases remains controversial (Hanson, Sadlier, & Muller, 2004; Morgan, Chang, Alqatari, & Pines, 2013; Shah & Cook, 2008). The demand for emergency departments, on the other hand, continues to rise. Occasions of services for emergency departments were again higher in the recent report released by the Australian Institute of Health and Welfare, compared to the previous year (2013).

Therefore, it is not surprising that issues related to the current situation facing emergency department services are keenly studied and widely published on by scholars around the world. The next section will present in more detail issues pertaining to escalating demand, including an overview of the international situation. Review of the existing data related to the rise in demand for emergency departments is presented, specifically regarding Queensland, but with reference to other Australian states and territories.

1.1.2 International situation

Emergency departments around the world are besieged by similar problems irrespective of the health care system existing in the country. For example, in California, Reeder and colleagues documented a 14% increase in emergency department visits between 1992 and 1999 (2002). In the US, despite a 12% decrease in the total number of emergency departments between 1992 and 2000, the number of visits to emergency departments increased by 27% (Schafermeyer & Asplin, 2003). An increasing number of visits to emergency departments has also been reported in various states of the USA (Asplin et al., 2003; Derlet, 2002; Roberts, McKay, & Shaffer, 2008; USGAO, 1993; Weber et al., 2008). Nawar, Niska and Xu (2007) estimated that, on average, 219 visits to US emergency departments were made every minute in 2005. Presentations to emergency departments continue to rise every year in England with a 9% increase noticed between 2003-04 and 2004-05 (Benger & Jones, 2008). A similar climb in utilisation rates has been reported in countries across the globe: France (Lang et al., 1996), Switzerland (Santos-Eggimann, 2002), Taiwan (Shih et al., 1999), Japan (Ezaki & Hashizume, 2007) and Canada (Bond et al., 2007; Holroyd, Rowe, & Sinclair, 2004; Schull, Lazier, Vermeulen, Mawhinney, & Morrison, 2003; Schull, Szalai, Schwartz, & Redelmeier, 2001).

1.1.3 Queensland and other states and territories

Australia is no exception in this situation. Hospital emergency departments have experienced considerable growth in the occasions of services over the past few years. Table 1.1 presents the annual growth rate of occasions of services during a ten-year period, with a 37% total growth rate during this period and a 3.6% growth rate on average per annum. Notwithstanding the inconsistency of the changes observed from year to year, a rising number of presentations to emergency departments each year is evident. The average growth rate documented for Queensland is 3.4%, which is 0.2% lower than the national average.

Table 1.1 Gross number of ED occasions of service in Australian public hospitals: 2000–2001 to 2009–2010

Year	Unit	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Australia
2000-01	‘000	1771	1144	1168	566	476	92	93	97	5407
2001-02	‘000	2003	1210	1220	561	469	101	95	95	5755
2002-03	‘000	1982	1261	1223	571	472	97	96	94	5796
2003-04	‘000	1986	1289	1248	580	461	101	97	102	5864
2004-05	‘000	2007	1318	1282	593	474	122	94	104	5993
2005-06	‘000	2137	1409	1304	629	496	134	100	120	6328
2006-07	‘000	2304	1468	1382	727	516	125	96	123	6741
2007-08	‘000	2418	1523	1471	778	544	143	98	125	7101
2008-09	‘000	2417	1538	1525	783	532	146	102	129	7172
2009-10	‘000	2443	1592	1578	823	555	159	107	133	7390
Total growth	%	37.9	39.1	35.1	45.5	16.6	73.3	14.8	36.7	36.7
Annual growth	%	3.7	3.8	3.4	4.4	1.8	6.6	1.6	3.6	3.6

ACT, Australian Capital Territory; NSW, New South Wales; NT, Northern Territory; Qld, Queensland; SA, South Australia; Tas., Tasmania; Vic., Victoria; WA, Western Australia.

Note. From “Demand for public hospital emergency department services in Australia: 2000–2001 to 2009–2010,” by G. FitzGerald, S. Toloo, J. Rego, J. Ting, P. Aitken and V. Tippett, 2012, *Emergency Medicine Australia*, *24*, p. 73. Copyright 2012 by John Wiley and Sons. Reprinted with permission.

1.1.3.1 Population growth and demand

Population growth is one of the most important factors identified in the rising demand for emergency department services, as the number of people influences and changes the demand for goods and services (Jacobs & Rapoport, 2002). A number of studies have addressed the impact of population growth on increasing demand. England, for instance, experienced a 2% growth for emergency department services but only a 0.5% growth in population during the same time period (Toloo et al., 2011). The results presented by Reeder et al. (2002), confirm the significance of population growth for the increase of utilisation rates for emergency departments.

Derlet (2000) supports the view that many emergency departments are experiencing an overall increase in volume as a result of regional population growth. At the same time, however, scholars state that this correlation cannot account for the entire growth.

Population growth in Australia has had an undeniable impact on the demand for emergency departments with a rise of 1.6% per annum for the 10 years to June 2010 (ABS, 2010b). Further, of all states and territories in Australia, Queensland has had one of the fastest growing populations over the past few years. In 2012, the annual rate of population increase in Queensland was 2% compared to the national average of 1.8% (ABS, 2013a). In New South Wales, the number of emergency department presentations increased by 6.9% between 2004/05 and 2006/07, even though the population grew by only 0.82% during the same period (Booz Allen Hamilton Ltd., 2007).

The impact of population growth alone is adjusted by examining the utilisation rate per 1000 people. Figure 1.2 presents the yearly utilisation rates per 1000 people between 2000-01 and 2009-10. "The overall emergency department presentations increased from 282 to 331 per 1000 persons during the studied period in Australia showing an average annual increase of 1.8%. The rates were consistently highest in the Northern Territory (NT) and lowest in Tasmania, Victoria, and the ACT" (FitzGerald et al., 2012, p. 3).

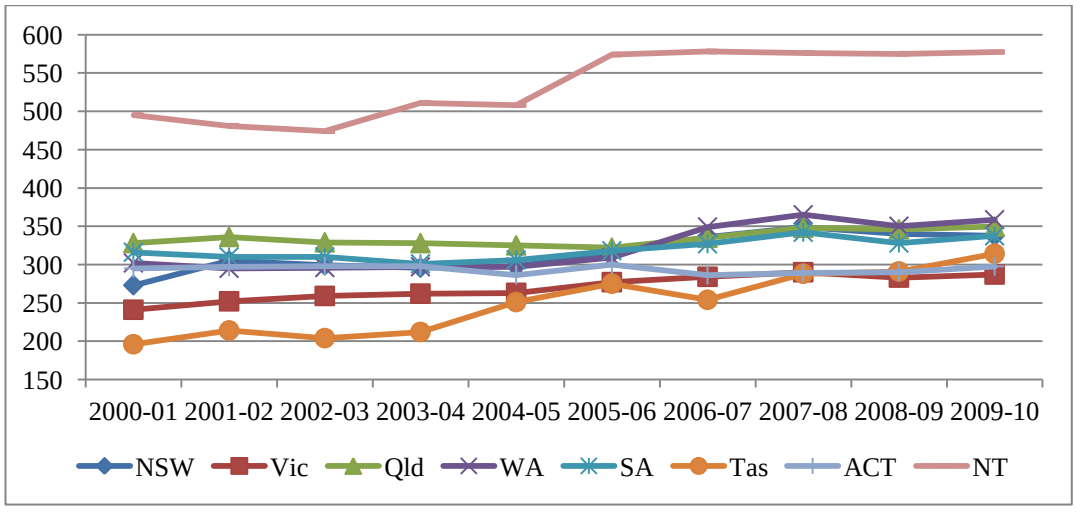


Figure 1.2 ED presentations per 1000 persons in Australian public hospitals: 2000–2001 to 2009–2010.
Note. From "Demand for public hospital emergency department services in Australia: 2000–2001 to 2009–2010," by G. FitzGerald, S. Toloo, J. Rego, J. Ting, P. Aitken and V. Tippett, 2012, *Emergency Medicine Australia, 24*, p. 74. Copyright 2012 by John Wiley and Sons. Reprinted with permission.

Interestingly, and as mentioned before, the average growth rate is slightly lower (0.2%) for Queensland in comparison to the other states. While Queensland has historically had a higher utilisation rate, the other states appear to catch up over time. It also should be noted that while utilisation rates for Queensland have been fairly steady for the past ten years, a significant rise in utilisation rates has occurred in other large Australian jurisdictions, which are now close to Queensland levels (FitzGerald et al., 2012).

1.1.3.2 Clinical urgency and demand

Emergency departments use the Australasian Triage Scale in order to identify the clinical urgency of presenting patients (see section 2.2.2 for details) and to provide them with time-critical intervention. As presented in Table 1.2, comparisons based on attendance by triage category for the two periods of 2003-04 and 2009-10 show that on a national scale a decrease was observed in triage categories 1, 4 and 5 by 0.1%, 1.1% and 2.1%, respectively. On the other hand, an increase was noted in triage categories 2 and 3 by about 1.5% and 1.8% respectively. Thus the growth in demand is more prominent amongst the more urgent than non urgent categories of patients.

Table 1.2 Percentage of emergency department occasions of service by triage category: 2003-04 and 2009-10

	NSW	***Vic***	***Qld***	***WA***	***SA***	***Tas***	***ACT***	***NT***	**Australia**
2003-04									
Resuscitation	0.8	0.7	0.6	0.6	1.1	0.9	1.2	1.0	0.8
Emergency	7.6	7.5	7.4	6.5	10.9	8.8	7.5	5.8	7.6
Urgent	32.9	28.4	34.7	21.5	34.3	35.7	23.9	27.2	30.5
Semi-urgent	44.6	47.7	47.8	45.0	47.9	47.4	42.1	52.6	46.3
Non-urgent	14.0	15.7	9.5	26.4	5.7	7.3	25.4	13.5	14.8
Total (no.)[2]	**1,433,674**	**1,043,992**	**763,378**	**579,746**	**302,938**	**81,256**	**91,547**	**94,102**	**4,390,591**
2009-10									
Resuscitation	0.6	0.6	0.8	0.8	1.2	0.6	0.5	0.6	0.7
Emergency	8.2	8.5	10.0	11.0	11.5	7.6	9.2	7.0	9.1
Urgent	29.7	30.0	39.7	30.9	35.9	34.4	31.2	27.6	32.3
Semi-urgent	44.4	46.7	41.5	49.9	43.7	46.6	45.7	53.1	45.2
Non-urgent	16.9	14.0	7.9	7.3	7.8	10.8	13.4	11.8	12.7
Total (no.)[2]	**2,035,783**	**1,432,745**	**1,134,092**	**600,613**	**373,700**	**141,360**	**106,814**	**132,583**	**5,957,690**

Note. From "Emergency Health Services: Demand and Service Delivery Models. Monograph 1: Literature Review and Activity Trends," by S. Toloo et al, 2011, Brisbane: Queensland University of Technology, p.73. Copyright 2011 by QUT. Reprinted with permission from corresponding author.

The proportion of patients in triage categories 4 and 5 decreased in most states and territories during the six-year period. In the same time, the percentage of higher acuity patients (triage categories 1 and 2) increased only in Queensland, Western Australia, and South Australia. The study also showed that patients in higher acuity triage categories were more likely to be subsequently admitted to the hospital than lower-acuity categories in the period between 2000-01 and 2009-10 (Toloo et al., 2011).

Thus, the increasing demand, utilisation rates and acuity of presenting patients over the last years require further investigation in order to understand causes and better predict trends with respect to population and social change.

1.1.4 Effects of rising demand

The increasing demand, combined with limited health care resources, affects delivery of care for patients and impacts on the proper functioning of emergency departments.

The high volume of patients accessing hospital care through emergency departments contributes to its crowding and overcrowding (Derlet, 2002; Drummond, 2002; Hoot & Aronsky, 2008; Richardson, 2006). In turn, overcrowded emergency departments contribute to longer waiting times for commencement of treatment and result in delays of essential treatment for patients (McCarthy et al., 2009; Pines & Hollander, 2008; Richardson & Hwang, 2001; Richardson & Mountain, 2009). Evidence from research show delays occurring in pain treatment and timely administration of medications including antibiotics (Hwang, 2007; Hwang et al., 2008). Longer waiting times also contribute to patients leaving emergency departments before receiving appropriate care (Stahl, 2008).

Patient safety is also compromised and patient mortality is one of the most commonly studied adverse outcomes of crowding (Hoot & Aronsky, 2008). Studies undertaken to date, have found a positive correlation between mortality rates and the weekly number of visits (Miro et al., 1999; Sun et al., 2013), as well as higher mortality among trauma patients presenting to emergency departments (Begley, Chang, Wood, & Weltge, 2004). Studies from Australia also report an increased risk of mortality, with an estimated 13 patient deaths per year due to overcrowded

emergency departments (Richardson, 2006; Sprivulis, Da Silva, Jacobs, Frazer, & Jelinek, 2006).

Reduced quality in medical care leads to patients' dissatisfaction with health services. A number of analyses revealed a statistically significant decrease in patient satisfaction with an increase in waiting times, occupancy rates, and hallway placements (Pines et al., 2008; Tekwani et al., 2013). Longer waiting times consequently contribute also to patients walking out of emergency departments without seeing a doctor, which may have a negative impact on their health (Gilligan et al., 2009; Mohsin, Young, Ieraci, & Bauman, 2005). In short, the more crowded the emergency department, the more dissatisfied are the patients.

The increasing demand for emergency health services also impacts negatively on staff and their work conditions. Overcrowded emergency departments contribute naturally to a stressful and hectic emergency environment (Fernandes et al., 1999; Mayhew & Chappell, 2003; Presley & Robinson, 2002) and impairs the occupational health and safety risks for staff. Job satisfaction decreases among the staff (Rondeau & Francescutti, 2005), which leads to a reduction of working hours (Crook, Taylor, Pallant, & Cameron, 2004; Gates, Ross, & McQueen, 2006; Taylor, Pallant, Crook, & Cameron, 2004).

Among other duties, emergency departments provide an educational environment for junior staff. Studies performed in this area show that overcrowded floors and pressure to fast track patients do not allow for quality of teaching and proper education (Atzema, Bandiera, & Schull, 2005; Hoxhaj, Moseley, Fisher, & O'Connor, 2004). This, combined with the recently introduced four-hour rule (see section 2.3), contributes to junior staff concerns and raises further questions relating to the quality of care provided to patients.

The effects of rising demand also impacts on financial resources and puts strain on other services and stakeholders. Emergency departments operate 24 hours a day and seven days a week. Thus, costs for emergency department visits are naturally two to three times more than costs for visits in other settings (Baker & Baker, 1994). A number of scholars have investigated how an extended length of stay of patients in emergency departments' impact on financial resources. The studies show that increased emergency department length of stay contributes to increases in hospital

costs by millions of dollars per year (Bayley et al., 2005; Foley, Kifaieh, & Mallon, 2011; Krochmal & Riley, 1994). Therefore, decreasing or eliminating emergency department boarding and improving movement to the inpatient setting has the potential to decrease costs.

Overflowing emergency departments unable to receive more patients impact also on pre-hospital services. Ambulance services transporting sick patients are not able to transfer them to emergency departments, which causes ramping of ambulances in front of hospitals (Eckstein et al., 2005; Schull, Slaughter, & Redelmeier, 2002). Diversion of ambulances from overcrowded emergency departments to other less busy facilities is also a well-known issue (Patel, Derlet, Vinson, Williams, & Wills, 2006; Vilke, Brown, Skogland, Simmons, & Guss, 2004). Both cases limit ambulance service readiness to respond in a timely manner to patients requiring medical assistance and remaining in the community.

1.1.5 Summary

The increasing demand for emergency department services remains a hot topic on the public forum and very concerning for patients. It is, however, not only an Australian problem, but widely known on an international scale. Increasing demand measured by the number of occasions of services for emergency departments is on the rise and the trend is similar across Australia. The highest growth can be observed in emergency and urgent visits (categories 2 and 3) among all the presentations to emergency departments. The relative demand, measured as utilisation rates per 1000 people, shows, however, that Queensland has higher rates than most of the states and territories. As a consequence, patients' safety, satisfaction and quality of care are affected. These effects are not limited to individuals but impact on health care resources including human, financial, and organisational resources. The consequences are also observed on stakeholders and impact negatively back on community.

1.2 THE RATIONALE AND SIGNIFICANCE OF THE RESEARCH

Notwithstanding an abundance of studies attempting to investigate the areas of emergency department utilisation, the demand for emergency department services has not been specifically defined and there is a lack of appropriate theoretical models for use in research conducted into emergency care settings. In order to fill this gap, this research

project will integrate existing health behaviour theories and develop a multidimensional model of emergency department services users. This is of particular relevance to interpersonal, cognitive, system, and community-oriented domains. Based on such a model, patients' perspectives and reasons for accessing emergency department services will be examined.

The findings will highlight the key drivers behind the current situation and augment the currently available data. It will also provide an evidence base for future policy development and for the new design or modification of existing systems. Improvements in patient's access to emergency department services are highly desirable and will have a beneficial impact on satisfaction of the community.

1.3 AIM OF THE RESEARCH

The overall objective of this study is to identify factors associated with the increased demand for emergency department services in order to provide information for policy proposals that can lead to improved service delivery. The aims are further subdivided into two studies with research objectives and questions specified below.

1.3.1 Study one

1.3.1.1 Objectives

- Produce a profile of emergency department users
- Analyse and evaluate factors that influence demand for emergency department services
- Identify patterns and scope of services provided.

1.3.1.2 Research questions

1) What are the characteristics of emergency department services users in Queensland?
2) What are the major factors influencing the demand for emergency department services?
3) Are there any patterns in the services provided?
4) What are the differences between the characteristic of users with respect to population characteristics?

1.3.2 Study two

1.3.2.1 Objectives

- Identify reasons for which patients present to emergency departments
- Analyse factors that patients took into consideration when exercising their choice of location for seeking care
- Identify the perspectives of users of emergency health services

1.3.2.2 Research questions

- What are the reasons behind a decision made by patients to present to emergency departments?
- What are the differences between various groups of users?
- What factors influence patient's decisions to utilise emergency department services?
- Which of these factors are the most important reasons for patients to utilise emergency department services?

1.4 INDIVIDUAL CONTRIBUTION OF THIS STUDY TO LARGER RESEARCH PROJECT

This study forms part of the larger research program: *The Emergency Health Services Queensland (EHSQ): Demand and Service Delivery Models*. The EHSQ research program was founded by the Australian Research Council through its Linkage Program (LP0882650) and was supported financially by the Queensland Ambulance Services (industry partner). The EHSQ research attempted to determine the factors influencing the growing demand for emergency health care (consisting of emergency departments and ambulance services), and to establish options for alternative service provision that may safely meet the needs of patients. The conception and design of this doctoral study remained integral to the EHSQ research program, although it focused solely on emergency department services and its users as defined above in the study objectives.

A series of monographs have been published as a result of the EHSQ research program. The second section *"Characteristics of ED users in 2010-11"* in *"Monograph 2: Queensland EHS Users' Profile"* (Toloo et al., 2012) was the sole responsibility of myself as the doctoral student. The same section also forms Chapter 6 of this thesis. Similarly, findings and interpretations in relation to emergency

department users and their perspectives published in *"Monograph 3: Patients' Reasons and Perceptions"* (Toloo, Rego, FitzGerald, Vallmuur, & Ting, 2013) represented the individual work of myself as the doctoral student. This material is partially included in Chapter 7 of this thesis.

1.5 STRUCTURE OF THE THESIS

This thesis consists of the following nine chapters as detailed below:

- **Chapter 1: Introduction**

  This chapter provides background information in relation to the demand for emergency department services, and an overview of the research aims and objectives.

- **Chapter 2: Overview of past and present emergency departments**

  This is an introductory chapter, which provides an explanation of the structure and role of emergency departments in current health care systems.

- **Chapter 3: Literature review**

  This chapter presents a comprehensive and critical literature review in relation to factors that influence and drive the demand for emergency health services. It looks broadly at existing research nationally and internationally. Finally, it identifies gaps in the literature that are to be addressed by the research questions.

- **Chapter 4: A model for emergency department services use**

  This chapter discusses theoretical approaches to health care utilisation, identifies key variables in connection to health care utilisation, and recognises the sources of variability in health care utilisation. Finally, it provides the rationale behind the proposed theoretical framework for this study, which is developed based on an amalgamation of the models and theories discussed.

- **Chapter 5: Methodology**

  This chapter outlines the study design, study population, sample selection, and the research instrument used for data collection from the users of emergency departments. It also provides a detailed account of the data collection procedure and describes the study measurements, statistical methods, and analytical plans for the data analyses.

- **Chapter 6: Results Study one: Characteristics of emergency department users**

This chapter presents the results from Study one and examines the objectives of Study one, which identified characteristics of users and factors contributing to the increased demand for emergency department services. It uses data obtained from Queensland Health and extracted from the Emergency Department Information System.

- **Chapter 7: Results Study two: study sample and results of descriptive analyses**

  This chapter presents the results from Study two and includes the presentation of data collection results, response rate, representation of the study sample, and discusses the demographic profile of participants and patients. It also presents results from descriptive analyses performed for all variables.

- **Chapter 8: Results Study two: Perspective of patients and their reasons for the utilisation of emergency department services**

  This chapter presents the further results from Study two and examines the objectives of Study two, which try to explain the reasons of patients for seeking care through emergency department services. Finally, it explains the relationship between patients' reasons and perspectives and the use of emergency department services.

- **Chapter 9: Discussion**

  This chapter discusses the present study findings, strengths and limitations, study implications, and recommendations for policy and future research.

Chapter 2: An overview of past and present emergency departments

2.1 A BRIEF HISTORY OF EMERGENCY SERVICES

The organisation and structure of emergency medical services involves multiple agencies and people working together to create a comprehensive system ready to respond rapidly to unpredictable events and deliver an advanced level of care. It is a system with a long history beginning with the early hunters and warriors who provided care for the injured. Although their methods were primitive, the basic idea of response to injury remains current to the present day for all emergency medical systems.

2.1.1 Early days

The first references to triage, treatment protocols, and emergency care, are found in the "Edwin Smith Papyrus" written in 1500 B.C. and in "the Babylonian Code of Hammurabi" (Post & Treiber, 2002). The Old Testament also presents a description of resuscitation when Elisha breathed into the mouth of a dead child and brought the child back to life (1 Kings). Further examples can be found in the New Testament where the Good Samaritan treated the injured travellers and instructed the others to do likewise (Gospel of Luke).

In keeping with the adage, "necessity is the mother of invention", many of the earliest developments in pre-hospital care were appropriated from military environments, as no other group of society had a greater need for methods to care for the ill and injured outside the hospital setting. The earliest documentation of pre-hospital care emanates from the 11th century when the Knights of St. John received instruction in first-aid from Arab and Greek doctors during the Crusades (ACEM, 2009a; Queensland Health & Department of Emergency Services, 2003). Thereafter, Queen Isabella of Spain was the first monarch to organise systematic care for injured soldiers. In 1487 after the siege of Malaga, the wounded soldiers were ferried to large tent-hospitals in bedded wagons which required up to 40 horses to be pulled (De Lorenzo & Mothershead, 2002). Similarly, in the late 18th and early 19th

centuries and during the French battles under the command of Napoleon Bonaparte, his chief surgeon, Barron Larrey, was greatly concerned about the lack of a system for the care of the wounded in the fields of battle. Consequently, Larrey arranged a systematised service of flying ambulances (ambulances volantes) and movable hospitals, which became an integral part of the whole army and placed them under the control of the Chief Surgeon of the Army (Robb, 1952). By the time of the Crimean War (1854-1856), the British Army attempted to establish an ambulance corps, which they termed the "Land Transport Corps". At the same time, Florence Nightingale was introducing new sanitary hospital practices which affected a significant fall in mortality from infection. A few years later in 1863, the International Committee of the Red Cross was founded as an organisation of civilian relief societies which would help to take care of the wounded in time of war (Eisenberg, 1997). Clara Barton, the founder of the American Red Cross, advocated that treatment should begin in the field. This concept became synonymous with her emblematic nursing philosophy which was to "treat them where they lie". Such a philosophy is still current practice for any modern emergency medical system (Beebe & Funk, 2005).

2.1.2 Modern emergency departments

Modern emergency departments as a part of emergency health services are a surprisingly recent development. Prior to the 1960s, many hospitals did not have designated emergency departments but just a single room with often poorly equipped, understaffed, and unqualified personnel (Future of Emergency Care in the US Health System Committee, 2006). In the United States, the Emergency Medical Services Systems Act of 1973 required the categorisation of emergency departments into eight fundamental groups: trauma, burns, spinal cord injuries, poisoning, cardiac, high-risk infants, alcohol and drug abuse, and behavioural emergencies. The local authorities were responsible for nominating the hospitals which were most appropriate to deal with each of these respective clinical cases. In many places, however, it did not function well and met with resistance from hospital administration (Post & Treiber, 2002).

In Australia, the first full-time Director of a 'Casualty Department' was appointed in Geelong, Victoria, in 1967. Other hospitals followed and, in 1981, the Australasian

Society for Emergency Medicine was established. During the 1980s, hospital casualty departments began to be transformed into emergency departments with better educated staff. This was largely facilitated and engendered through the formation of the Australasian College for Emergency Medicine (ACEM) in 1983. Also connected to this process was the recognition of the emergency medicine specialisation as a separate medical profession the following year (ACEM, 2009b). In order to provide adequate care for patients in emergency departments, training programs in emergency medicine were developed and emergency medicine as a principal specialty was formally approved on 8 August, 1993, by the Commonwealth Minister for Health (ACEM, 2009b). Similar developments in nursing education during the same period followed with the establishment of the College of Emergency Nursing Australasia in 2002 to foster excellence in emergency nursing practice (College of Emergency Nursing Australasia, n.d.).

Over the last four decades, the emergency department in Australia has become a highly specialised place within hospitals through its provision of a wide spectrum of medical care by well-trained emergency staff, and is available to people regardless of the time of day and/or the number of patients already in care. The ACEM now defines emergency medicine as "a field of practice based on the knowledge of skills required for the prevention, diagnosis and management of acute and urgent aspects of illness and injury affecting patients of all age groups with a full spectrum of undifferentiated physical and behavioural disorders. It further encompasses an understanding of the development of pre-hospital and in-hospital emergency medical systems and the skills necessary for this development" (2009c, p.1).

Accordingly, the emergency department has also received more refined definition with its designation as a hospital department that specialises in the provision of emergency medical care for patients who are delivered by ambulance, referred by their doctor, or choose to seek treatment in an emergency department. Indeed, the ACEM (2009a) defines an emergency department as a dedicated area in a hospital that is organised and administered to provide a high standard of emergency care to people in the community who perceive the need for, or are in need of, acute or urgent care including hospital admission. Emergency departments thus require highly specialised medical staff, access to the services of allied health staff, and 24-hour

access to pathology, radiology, and operating theatre services. ACEM mandated that emergency departments are obliged to be part of a recognised hospital and be licensed by an appropriate authority.

ACEM also outlined the following conditions that must be met for emergency departments to receive such recognition and license:

- emergency departments must be purpose-designed;
- emergency departments must include a dedicated area with the capacity for advanced life support including mechanical ventilation designed and used for the reception and stabilisation of critically ill patients;
- emergency departments must operate with a registered nurse on duty at all hours, together with a senior nurse responsible for the organisation of nursing services;
- emergency departments must have access to a senior emergency physician who is on-call 24 hours per day for clinical support (ACEM, 2002).

2.2 THE FUNCTIONING OF EMERGENCY DEPARTMENTS

2.2.1 The structure of emergency departments

The core business of emergency departments has changed significantly over the last 20 years due to factors such as changing demographics and changes in health care provision in hospitals and the community. There are now 104 accredited emergency departments in Australia, including 21 emergency departments in Queensland (ACEM, 2012).

The ACEM provides classification of emergency departments according to their role and level of function, and groups them into 3 major categories:

- major referral;
- urban district; and
- major regional /rural base emergency departments.

There are two other categories: the rural emergency service and primary care/remote rural emergency service that relate to hospital-based services, although these are too small and/or under-equipped to be considered emergency departments for accreditation purposes (ACEM, 2004b). There is also other classification utilised by the Australian Institute for Health and Welfare, which groups all emergency hospitals into four geographical locations. Details are provided in section 5.4.3.1.

Major referral emergency departments manage and provide comprehensive initial care for all emergencies — including trauma — with a wide-range of subspecialties, including neurosurgery and cardiothoracic surgery, on site. These facilities have experienced nursing and medical staff on site 24 hours a day, although consultant coverage is likely to be 24 hours on call rather than on site. In some states, emergency departments also form part of a critical care network.

Emergency departments in outer metropolitan hospitals vary from basic emergency departments with designated nursing staff and on-call medical staff, to those that provide a full range of services. Major trauma cases are generally transferred to tertiary referral hospitals. Base/regional hospitals in rural areas play a role that falls between tertiary referral hospitals and other metropolitan hospitals. Base hospitals typically provide high-level emergency services with trained nurses and medical officers on site. Other rural hospitals provide basic emergency care for resuscitation and limited stabilisation from nursing staff with a medical officer on-call. These facilities do not have the capacity to provide definitive care in cases of major trauma. Often the doctor providing emergency care is a local GP. In smaller rural communities, emergency services are provided from the local hospital by a local GP. In remote areas, emergency services would also be provided by the local GP, the local hospital, or the Royal Flying Doctor Service. Over fifty percent of specialist emergency departments are located in major referral hospitals (AIHW, 2011a).

Emergency departments in urban areas generally receive patients from surrounding residential and industrial areas. The demographic mix of patients is typically wide. The sample of patients can vary, however, particularly in cases where itinerant groups might be patronising holiday resorts or sports stadiums. Patients presenting may be of any age and either sex, have a full spectrum of ailments and injuries from life-threatening to minor, and range from articulate to unable to communicate (Coleridge, Cameron, White, & Epstein, 1993; Laiw, Hill, Bryce, & Adams, 2001).

In addition to the emergency departments in public hospitals, there are also emergency departments in private hospitals that have been operating mainly in capital cities in Australia since 1988 (Commonwealth Department of Health and Ageing, 2001). The latest available statistics estimates that there are 24 private

emergency departments in Australia, with 47 private hospitals providing emergency care. Interestingly, only 6% of emergency department visits were made to a private hospital, even though around 46% of the total population have private basic hospital cover (ABS, 2013b; FitzGerald et al., 2013).

2.2.2 Patient's pathways through emergency departments

There are a couple of possible pathways into hospital care: General Practitioners offer primary medical services and for many are the first point of contact within the health care system when treatment is needed (Duckett & Willcox, 2011). The other possible pathway leads through emergency departments for unscheduled visits. Thus, emergency departments are required to be available for patients seeking care, regardless of time of day or the number of patients (Duckett, Jackson, & Scully, 1997). They need to remain open and prepare for any eventuality. This makes resource management within emergency departments extremely complex and uncertain (Richardson et al., 2003).

Patients using the services of an emergency department may initially deal with reception and then be triaged or assessed for their level of urgency. The term "triage" describes the assessment of a patient's medical condition by a qualified medical practitioner after which an assignment based on the requirement of urgent medical attention is done in accordance with outlined categories (ACEM, 2009c). The assessment is most commonly undertaken by an experienced nurse. The ACEM (2000) lists five categories of triage and outlines the maximum waiting times for patients before they receive treatment by a nurse or doctor for each of these categories as described below:

Triage category 1: Patients in this category are critically ill and require urgent attention. They typically arrive by ambulance, require resuscitation, and need to be seen immediately.

Triage category 2: Patients in this category might also be critically ill and/or in severe pain, and need to be seen within 10 minutes. Patients with breathing difficulties, serious bone fractures, and/or severe chest pains likely to be related to a heart attack would exemplify those assessed as triage category 2.

Triage category 3: Patients in this category might include those suffering from serious illnesses. Patients with serious bleeding from wounds, fractures, dehydration, persistent vomiting, and head injuries, but who are conscious, would fall into this group. They should be seen within 30 minutes.

Triage category 4: Patients in this category present with conditions which could be potentially serious but with non-severe injuries or symptoms. They should be seen within 60 minutes. Patients with mild head injuries, sprains, fractures, migraine, mild bleeding, abdominal pain, and earache would receive such an assessment.

Triage category 5: Patients in this category are those with minor conditions or symptoms. They are considered non-urgent in terms of the requirement for medical attention and thus only need be seen within 120 minutes. The conditions (including minor aches and pains, and rashes) may have developed and persisted for more than one week. Also, patients with chronic illnesses experiencing minor relapses may require stabilisation.

Once the triage nurse has assigned a patient to a triage category, the task of collecting data pertaining to the medical history of the patient and providing instructions for the nurse who is to treat the patient in the cubicle begins. This is immediately followed by registration, which is the recording of personal details of the patient. During this time, a check/search is performed to ascertain if the patient has a medical record at the hospital. If the patient requires urgent medical attention, registration can be deferred.

The direction of a patient to a treatment site (which is typically a bed in a cubicle of the emergency department) is known as "patient placement". This happens as cubicles become available. In the cubicle, a patient receives treatment from a nurse based on procedural orders generated by the triage nurse until a doctor is available to attend the patient. When a doctor becomes available, and based on a computer-generated list of patients who might be yet to see a doctor, another medical assessment is undertaken. The prioritising of patients depending on urgency or a doctor's specialisation is common (Dojorhan & Churilov, 2003).

Once the patient is stabilised, the risk of injury or deterioration is minimised and an action plan for further treatment or follow-up if required is established, discharge maybe initiated. Patients presenting to emergency departments are typically discharged home as soon as treatment is completed. In such cases, patients usually leave the emergency department quickly and largely unaided. In addition to their regular use as critical care facilities, emergency departments also function as holding centres for patients awaiting admission to a ward and also provide services for patients returning to hospital seeking medical care.

2.2.3 Financing of emergency departments

The Australian national health care system aims to give universal access to health care for all citizens and eligible people including residents and foreign nationals whose countries have reciprocal health agreements with the Australian Government.

The Medicare system was introduced in 1984 and includes the following features:

1. A universal system that provides health insurance for all Australian citizens;
2. The provision of 85% of the scheduled fee for all non-hospital medical consultations provided by a recognised medical practitioner or an approved health professional. The scheduled fees are periodically negotiated and updated between the Commonwealth Government and the representatives of health professions;
3. The provision of free in-patient, out-patient, and emergency treatment in public hospitals, and payment of 75% of the cost for private hospital treatment;
4. A Medicare levy which is a 1.5% levy on taxable income as a part of the general revenue for health expenditure. High income individuals without private health care cover need to pay an additional 1% surcharge on their income to Medicare (Willis, Reynolds, & Keleher, 2009).

Medicare is financed mainly from general taxation revenue, which includes a Medicare levy, as well as patients' out-of-pocket costs and private insurance premiums as presented in Figure 2.1.

The responsibilities for the funding of healthcare are shouldered by the three levels of government in Australia (Federal or Commonwealth, state/territory, and local) albeit from different perspectives and with different functions and capacities. Local

government supports healthcare facilities at a municipal level. State/territory government assumes responsibility for the funding and operation of healthcare facilities within its jurisdiction. This includes the financing of all public hospitals, public health services, and psychiatric institutions. As such, emergency departments in public hospitals are owned, managed, and funded by states and territories. About two thirds of the total funding comes from government (43% from the Australian federal government and 26% from states governments) and one third from individuals, either directly or through health insurance payments.

Private health insurance in such is an integral part of the Australian health care system and an important component of the funding of heath care. It provides about 7.6% of the total national health care funding. It also allows individuals to obtain health services through a substantial private sector of healthcare providers and assists with meeting the costs of private sector services which are not covered by Medicare, e.g. dental, optical, physiotherapy, and podiatry services (Australian Institute of Health and Welfare, 2012).

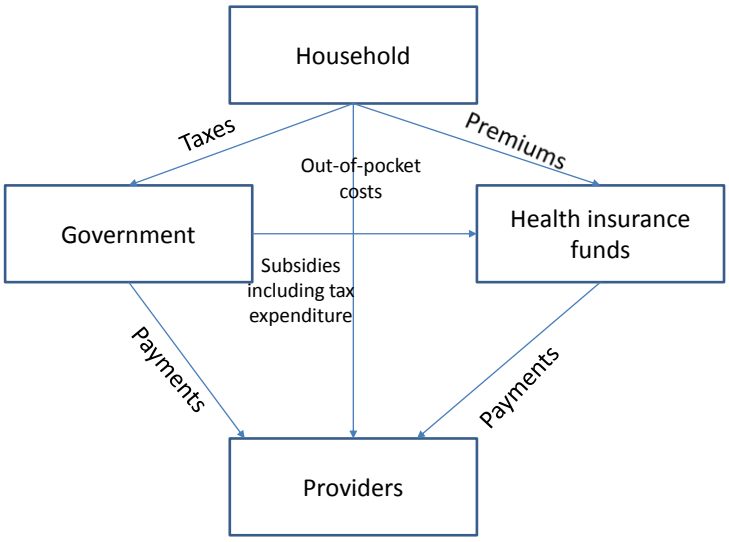


Figure 2.1 Simplified flow of health funds in the domestic health sector.

Note. From "*The Australian Health Care system*" by S, Duckett, & S. Willcox, 2011, (4th ed). Oxford University Press, p. 48. Copyright 2011 by Oxford University Press, Australia and New Zealand. Reprinted with permission.

The revenue from the Medicare levy and other non-government sources in 2010-11 was A$40 billion, while the total health expenditure during the same period was estimated at A$130 billion which accounts for about 69% of the total Commonwealth and states/territories health expenditure for that year (Australian Institute of Health and Welfare, 2012). About 40% of expenditure goes to hospitals, both public and private.

The funding of public hospitals by state and territory governments constitutes the most significant aspect of health expenditure. State and territory governments spent A$34.4 billion (26.4%) of the total health expenditure on meeting the operating costs of public hospitals in 2010-11(Australian Institute of Health and Welfare, 2012). This places an onerous burden on the states and territories to fund outlays through various revenue-raising initiatives. Thus, the federal government is frequently called upon to make up the States' shortfall (Barraclough & Gardner, 2002). In assuming this role, the Commonwealth government exerts significant influence on state/territory government health policy. The eligibility of hospitals for funding is determined by performance statistics which the Commonwealth and State governments gather as a reference tool and to ensure that public interest is being served.

2.3 HEALTH REFORM IN EMERGENCY DEPARTMENTS

More recently, issues surrounding the functioning of emergency departments have become a significant part of the National Health Reform introduced by the Rudd government in 2010. As part of the five-year National Health and Hospital Network Agreement, states and territories receive 50% of the efficient price for inpatient and outpatient services (including emergency departments) provided to public hospitals (Council of Australian Governments, 2010). Further, the Agreement specified a few recommendations that needed to be implemented by emergency departments across the states and territories.

One of the first recommendations impacting on emergency departments was the implementation of the National Emergency Access Target (NEAT). This is more commonly known as the four-hour rule, and aims to treat and either admit or discharge patients within four hours from arrival to the emergency department. Such an initiative was already in place in countries such as the UK, which, in 2004,

stipulated that 90% of patients arriving to emergency departments should be released within four hours. Two years later this target was raised to 98% (Mason, Weber, Coster, Freeman, & Locker, 2012). Western Australia (WA) endorsed a four-hour rule program in January 2008, and the initiative commenced in April 2009. This lead was followed by the other states and territories. The initial target in WA was set at 85%, with a goal of 98% to be achieved by April 2011 (Geelhoed & de Klerk, 2012). This process has resulted in changes at a whole-of-hospital level, as such transformations were required to achieve the stipulated targets. As this process is currently happening in Australian emergency departments, there are some studies showing that the introduction of a four-hour rule has led to improvements in the proportion of patients managed within this timeframe. This has resulted in fewer prolonged stays within emergency departments and a decrease in overcrowding (Geelhoed & de Klerk, 2012; Newnham, De Villiers Smit, Keogh, Stripp, & Cameron, 2012). To date, however, there is no evidence that the 98% four-hour target benefits patient care. Indeed, some authors suggest that it has "encouraged target-led care rather than needs-led care" (Mason et al., 2012, p. 348). There have also been a number of concerns raised by junior medical staff who felt that such targets devalues the quality of care, contributes to a loss of training and education opportunities, and in some instances may lead to poorer patient outcomes caused by wrong decisions and inappropriate transfers to hospital wards (O'Sullivan, 2010). There are also reports indicating that the workloads and investigations have shifted from emergency departments to the admitting wards in the haste of emergency departments trying to meet their targets. While still in the early days, a number of concerns have been raised suggesting the targets are not being met by many emergency departments as the profile of patients is changing with more older and sick patients seeking care through the emergency department services and consequently requiring more time and care (Schuh, 2012). Following the introduction and criticism of the four-hour rule, the UK introduced a new balanced scorecard of indicators including three time-based measures. It has been decided, however, that the focus of emergency care concentrates on clinical outcomes together with the experience of the patient while admitting the significance of the timeliness of care (Forero et al., 2011; Goh, 2011).

Interestingly, another proposal in the Agreement identified additional funding for emergency departments from 2014, including $250 million as a reward for meeting the four-hour rule targets. A further $250 million included upfront payments and additional $250 million for capital developments. There was, however, a lack of clarity as to how these funds would be allocated, and if it will address the major functional and operational issues surrounding emergency departments (FitzGerald & Ashby, 2010).

Two other recommendations included the development of activity-based funding and a performance framework for emergency departments. Activity-based funding commenced in emergency departments from 1 July 2012, and uses the urgency-related groups (URG) classification to describe emergency department activities. URG provides a summary of the complexity and type of patients treated within an emergency department. It is a tool used for the determination of the national efficient price. Nevertheless, it requires significant analysis and evaluation before its broad application (FitzGerald & Ashby, 2010). Similarly, a performance framework for emergency departments needs to be developed which includes a variety of indicators that reflect an emergency department's functions and balanced performance evaluations. The framework can be used for benchmarking purposes and the improvement of activities. It is believed that such indicators should be relevant, efficient, measurable, significant, reflect quality, and be subject to management interventions in order to develop an evidence-based framework for an emergency department (FitzGerald & Ashby, 2010).

2.4 SUMMARY

This chapter provided an overview of emergency departments from their early and unstructured beginnings, through to their development in more recent history, and up to the current structures and functions experienced today. It also underlined its importance from the patients perspective as one of many possible ways to access care and described patients' pathways through emergency care. Finally, the chapter has provided a structural and financing overview, and indicates the current reforms relating to emergency department activities which are being undertaken as a part of the National Health Reform and which may influence the accessibility and quality of care for patients receiving services from emergency departments.

Chapter 3: Concepts and literature review

This chapter consists of two major parts. The first part explains the concept of demand for health care services, followed by an introduction of the input-throughput-output conceptual model for emergency departments. The second part describes the searching techniques and examines the existing literature on the following four topics related to the rising demand for emergency department services: 1) socio-demographic factors; 2) inappropriate users of emergency departments; 3) frequent users of emergency departments; and 4) health system related factors and use of emergency department services. The literature review identifies the key issues and highlights areas where further research is needed.

3.1 UNDERSTANDING DEMAND FOR HEALTH SERVICES

The concept of demand comes from the discipline of economics and refers to a buyer's desire, willingness, and ability to pay for a particular commodity at a given point in time (Sullivan & Sheffrin, 2003). The quantity demanded is the amount of a product people are willing to buy at a certain price, and this relationship is graphically presented on the demand curve. The demand curve is two-dimensional and its negative slope shows that when prices increase, the quantity demanded declines (Besanko & Braeutigam, 2005). This approach cannot, however, be easily translated to health care. Unlike most other goods, people do not enjoy the experience of consuming health care, but instead desire good health. They value the positive effects health care can provide when they are in need (Guinness, 2011). There are four different types of needs (normative, comparative, felt, and expressed) and actions undertaken based on the recognition of a need varies between individuals (Duckett & Willcox, 2011). Definition of need in medical care includes individual symptoms, illness, disability, as well as preventative services for which medical services can be sought.

Normative needs more specifically, are those which experts determine as essential for a particular group of a population. Examples would include immunization, screening and preventative services, or prenatal care. Similarly, comparative needs relate to the requirements of similar population groups in nearby regions. When one population, based on scientific evidence, receives certain services (e.g. fluoridated water), the other

population may be in need of that service too. This is in opposition to felt need, which is a subjective view of the patient or the community. It is a prerequisite to seeking care, even if the felt need may not be based on actual physiological conditions. Felt needs may not be acted upon as factors such as economic, psychological, or social may prevent people from seeking care. When a felt need makes people seek care through general practitioners or other health facilities, it becomes an expressed need which, together with the willingness to spend resources (including money, time, travel, energy, and inconvenience) constitutes demand for health services. Utilisation, on the other hand, occurs when the individual actually acts on this demand and receives health services (Tulchinsky & Varavicova, 2008).

The pioneering work by Grossman introduced the demand for health care model which goes beyond traditional demand analysis and has been extremely influential in health economics (1972). It utilises the idea that individuals are active producers who spend time and money on the production of health. A person is born with an initial stock of health. They add to this by investing in human capital (health and education) to improve outcomes in both the market (work) and non-market (household) sectors. The rate of health production will depend on the efficiency of investment in health. Good investment in health will include, among others, factors such as healthy life style, suitable environmental conditions, and the medical care received. At certain situations in life (unexpected medical conditions) and over the course of a lifetime, health depreciates and people will endeavour to decrease this tendency by higher investments in health and increased use of medical services. Thus, the demand for health care is derived from a demand for health and a demand for health is derived from the demand for utility (e.g. healthy days in which to participate in leisure and work). Demand can be affected by different factors and players in the market as presented in Figure 3.1. Individual demand for health is affected by many factors such as socioeconomic, educational, and cultural barriers or incentives to health care, as well as age and health status (Tulchinsky & Varavicova, 2008). Demand can be further affected by both provider and supply. Classical market theory is based on a consumer sovereignty which suggests that individuals are the best judges of their needs (Lerner, 1972). They also make their decisions based on personal preferences, knowledge, and experiences.

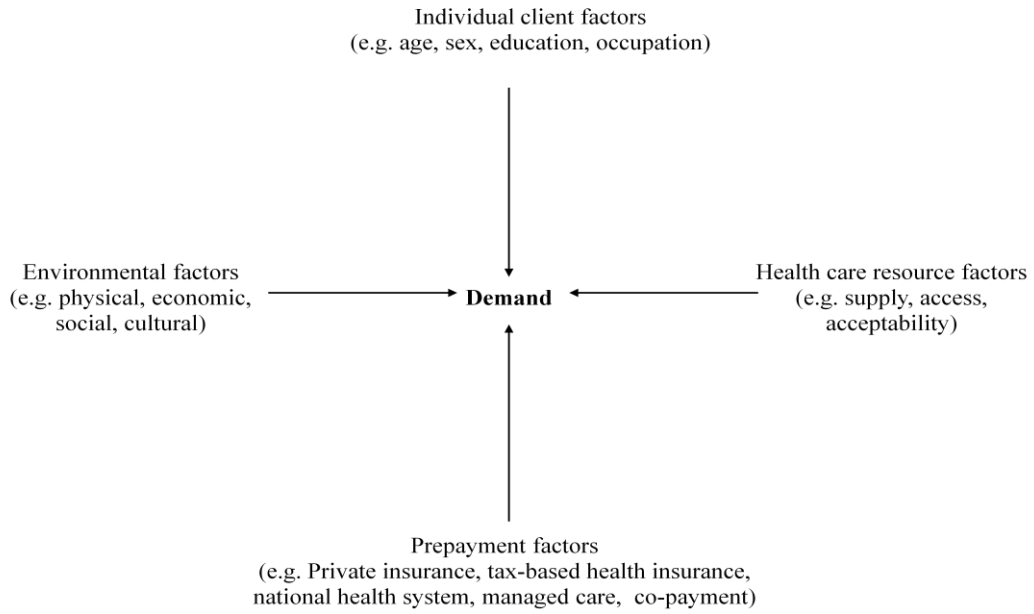


Figure 3.1 Factors in the demand for health services

Note. From "*New Public Health: An Introduction for the 21st Century*" by T. Tulchinsky & E. Varavicova, 2008, (2nd ed). Academic Press, p. 578. Copyright 2008 by Elsevier Books. Reprinted with permission.

Opponents of this view argue that this approach cannot be simply applied in medical care due to the complexities of market mechanisms which are determined not only by consumer choices but also by supply, access, and methods of payment (Tulchinsky & Varavicova, 2008). Consequently, demand can be induced by supply. Examples of this situation may include overproduction of vaccines and its distribution to the general population that normally would not be targeted, or provision of unnecessary medical services by physicians because they are covered by third party or are a part of an insurance plan. Market theory assumes also that consumers make decisions based on their knowledge and preferences. Again, the health market mechanism works differently, as individuals rely often on their doctors to make a decision based both on their needs and the available supply of services. Demand can thus be affected by providers. Large numbers of providers in a free market results in high competition and lower prices to attract buyers. This, however, is not common in the medical market, as existence of a limited number of providers such as hospitals or insurers leads to monopolies or oligopolies, and results in the establishment of a fixed price (Tulchinsky & Varavicova, 2008).

In conclusion, market mechanisms in health care work differently and even health care systems, with equal and free access for everybody, experience limitations of supply.

Thus, an understanding of health care market mechanisms is essential for any reform of health systems.

This section presented theoretical insights into demand for medical services in general and illustrated the complexity of drivers existing in the health market. The section below discusses more specifically the demand for emergency department services.

3.2 THE INPUT-THROUGHPUT-OUTPUT MODEL

The input-throughput-output conceptual model of emergency department services developed by Asplin et al. (2003), provides a practical framework for patient flow within the acute care system. As indicated in the title, there are three components of the model: "input", "throughput", and "output" (Figure 3.2). "Input" is defined as "any condition, event, or system characteristic that contributes to the demand for ED services" (Asplin et al., 2003, p.176). "Input" includes not only legitimate emergencies but also patients seeking emergency care because they were unable to access urgent or out-of-hospital care elsewhere. In countries without national health insurance, emergency departments remain the only accessible provider for a vulnerable population such as the uninsured or Medicaid beneficiaries (Asplin et al., 2003) (see section 3.3.3). There have been further interpretations and additions to the Asplin model. The Robert Wood Johnson Foundation included in the input element factors such as demographic, societal, as well as the perspectives of patients, and the range of reasons including personal preferences or lack of alternatives, for the chosen presentation at emergency departments (Nolan, Regenstein, Anthony, & Siegel, 2009). There have also been attempts thus far to update and expend the model in order to capture the multiple factors that affect care provided by emergency departments. As such, an input component additionally includes conditions, events, or system characteristics that contribute to the demand for acute care services (Kindermann, 2012). Input factors thus constitutes the demand for emergency department services, and depends on the volume of ill and injured people and the capability of the health care system to address the needs of individuals before directing them to emergency services.

The middle component of the model, "throughput", represents the actual processes involved in a patient's treatment and care provided in emergency departments. The "throughput" factors define the impact on an emergency department's efficiency and

its ability or inability to cope with the demand for services. This component of the model refers to the available sources within emergency departments and their processes and polices. Examples of throughput factors would begin from triage processes and examinations by nurses and physicians, through to medical testing, radiology exams, and consultations, and finally to discharge procedures. Factors that potentially affect the functioning of emergency departments adversely have been identified by a number of studies and include a broad range of factors such as staffing inadequacies, delays in ancillary testing, and problems with on-call consultants (Hoot & Aronsky, 2008; Olshaker & Rathlev, 2006; Yoon, Steiner, & Reinhardt, 2003).

"Throughput" factors do not cause an increase in demand per se. They remain, however, an integral part of the acute care system and need to be understood in order to provide comprehensive solutions to the management of these services.

The last component of the model: "output", address the ability to move emergency department patients to their next disposition. For the majority of patients, this represents a discharge from the emergency department, but for others it signifies admission to inpatient care. Similar to the second component, this takes into account the availability of resources and any actions that allow for the management of patients in in-patient care or in the community. A well-known situation arises when the emergency department care for a patient is completed but a person is prevented from being admitted to an inpatient bed due to its lack of availability. In literature, this is defined as access block and has been contributing immensely to emergency department crowding (ACEM, 2008; Cameron, Joseph, & McCarthy, 2009; Fatovich, Nagree, & Sprivulis, 2005; Walters & Dawson, 2009). Unlike "throughput", the "output" factors directly or indirectly impact on the demand for emergency department services. Unmet needs of patients in the community and the general lack of available alternatives will direct people back to emergency departments. Understanding of these components is essential alongside the study of demand factors.

Figure 2.
The input-throughput-output conceptual model of ED crowding.

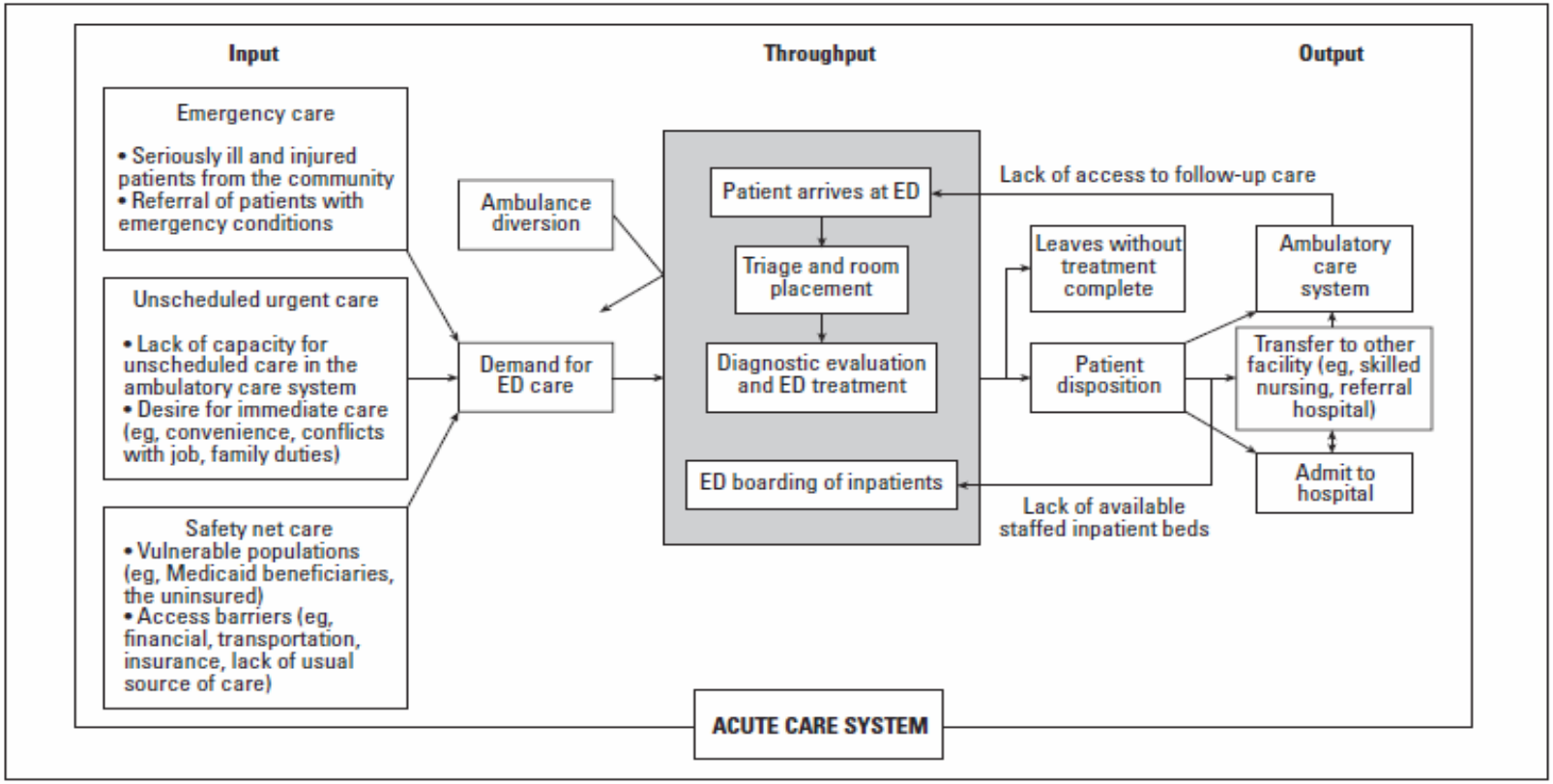


Figure 3.2 The input-throughput-output model of emergency department crowding
Note. From "A conceptual model of emergency department crowding" by B. Asplin, D. Magid, K. Rhodes, L. Solberg, N. Lurie, C. Camargo, 2003, *Annals of Emergency Medicine, 42,* p. 176. Copyright 2003 by John Wiley and Sons. Reprinted with permission.

This tripartite model has been appropriated and used in a significant number of studies in the field (Hoot & Aronsky, 2008; McCarthy et al., 2008; Solberg, Asplin, Weinick, & Magid, 2003). The understanding of two components of this model, "throughput" and "output", are particularly useful primarily because these areas are largely under the control of the hospital (Nolan et al., 2009). This model which was developed a decade ago, facilitated the identification of potential emergency department "throughput" and "output" strategies contributing to improving the quality and efficiency of care, and assisted in decreasing emergency department crowding. Among others aspects, successful and tested "throughput" strategies include rapid admission policies such as accelerated care at triage and in-room registration (Chan, Killeen, Kelly, & Guess, 2005; Quinn, Mahadevan, Eggers, Ouyang, & Norris, 2007). Other hospitals have created ambulance diversion guidelines and designed pre-diversion protocols to assist the distribution of patients seeking care (Vilke et al., 2004), and have added services for inpatients awaiting beds, set up a satellite laboratory in the emergency department, and improved the capacity of intensive care units (Lee-Lewandrowski et al., 2003; McConnell et al., 2005). The four-hour rule (as explained in section 2.3) has also been identified as an important strategy in the management of overcrowded emergency departments (Geelhoed & de Klerk, 2012; Newnham et al., 2012).

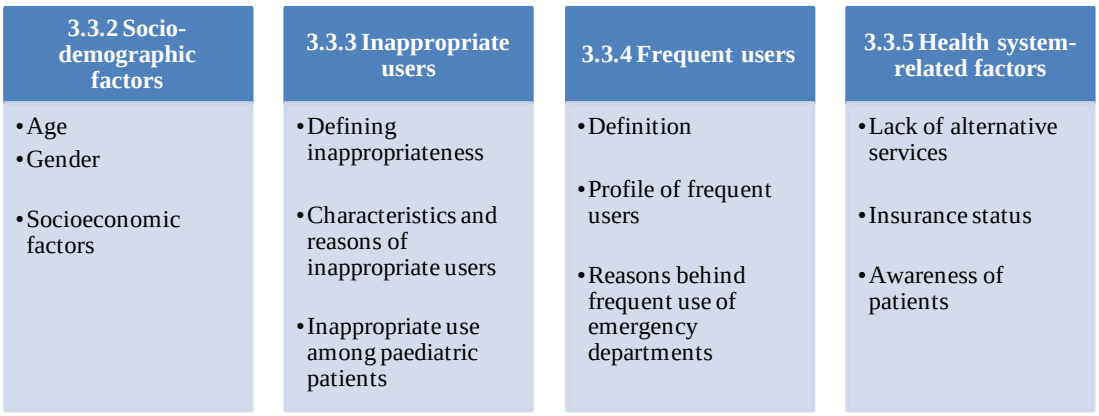
The first component of the model, "input", remains beyond the control of the hospital, and relates to demand generated at individual and community levels. It is the most applicable part to the current study of demand for emergency departments. It offers an excellent guide to understanding the complexity in pinpointing the sources of an emergency department's demand, and it will also provide a framework for the literature review discussed in the next section.

3.3 LITERATURE REVIEW

3.3.1 Search strategy

Based on the conceptual model for emergency departments explained in the previous section, the existing literature is reviewed in four sections: 1) socio-demographic factors; 2) inappropriate users of emergency departments; 3) frequent users of emergency departments; and 4) health care system-related factors. The detailed content of this section and topics are presented in Figure 3.3.

3.3.1 Literature review - search



3.3.6 Literature review - summary

Figure 3.3 Literature review topics

The literature review was performed via extensive searches of health and public health related databases such as Pub Med, Science Direct, ProQuest, and Ebscohost. Additional searches were also conducted through search engines including: Google and Google Scholar. General databases and internet-based searches including the Australasian Digital Theses Database and the Conference Papers Index were also undertaken to identify the grey literature and/or unpublished research from government and institute reports, conference proceedings, theses, and working papers. In an effort further to identify potentially relevant articles, additional searches were performed on: the reference lists of relevant articles obtained, publications by key authors and in key journals of emergency medicine.

The search terms used to identify relevant citations included MeSH terms and keywords. Combinations of key words in the title or abstract related to emergency departments, demand, factors associated with rising utilisation of emergency departments, were also used. Additional terms, specific to the four topics (e.g. frequent users, inappropriate users), were applied to broaden the search strategy.

The extensive literature results obtained was restricted by a set of inclusion and exclusion criteria. The searches were limited to papers published in the English language, and those published after 1990. Material unavailable in full text was

excluded from this review. All studies selected through the search were checked for relevance to the topic and purpose of the review based on the information provided in the title and abstract. Peer reviewed articles selected and discussed in this review, ensured a high level of quality, and supported the validity of the findings and conclusions (Hayes et al., 2006).

Thus, significant efforts were made to identify all relevant literature on the presented topics. It is possible, however, that some material may have been overlooked or not found. It is, however, improbable that the uncovered material would affect the conclusions drawn based on the performed reviews.

3.3.2 Socio-demographic factors

The socio-demographic factors of patients are summarised and will be reviewed according to three categories including age, gender, and number of socio-economic aspects as indicated in Figure 3.3.

3.3.2.1 Age

In accordance with Grossmann's demand theory, utilisation of health care increases with age as health status deteriorates. Emergency department services are no exception. Age is definitely regarded as one of the most significant factors influencing the demand for emergency departments and it is also a factor which attracts considerable attention among scholars.

A detailed review of published studies across the globe, highlights a general agreement among scholars that as population ages, the utilisation rates of emergency department visits rises commensurately for elderly groups of patients (George, Jell, & Todd, 2006; Hider, Helliwell, Ardagh, & Krik, 2001; Lowthian et al., 2012; Meisel, Pollack, Mechem, & Pines, 2008; Peacock, Peacock, Victor, & Chazot, 2005; Reeder et al., 2002; Roberts et al., 2008; Shah, Glushak, Karrison, & Mulliken, 2003; Xu, Nelson, & Berk, 2009). A number of studies have confirmed this trend. In the United States, a 34% increase in visits made by 65-74 year old patients has been observed during 1993-2003 (Roberts et al., 2008). Another increase in emergency department visits has been reported based on the nine year period (1992-2000), where, in the majority of age groups examined, the most dramatic changes occurred in the elderly population over 80 years old with an increase by 83% and those over

90 years increasing by 138% (Reeder et al., 2002). Similarly, a USA National Health Statistic Report (Piits, Niska, Xu, & Burt, 2008) has stated that persons aged 75 years and older had the second highest per capita emergency department visitation rate at 60.2 visits per 100 persons.

A study conducted in France, where data was collected from 150 hospitals nationwide, reported a 12% increase in emergency department visits in reference to people 75 years old and over (Lazarovici, Somme, Carrasco, Baubeau, & Saint-Jean, 2006). This was the highest incidence of any age group. Patients older than 65 years of age also represented almost 50% of emergency department visits in Norway during a single year (Bjørnsen, Uleberg, & Dale, 2012). It is difficult to express the utilisation in a single number, as it differs between countries and even emergency departments. Some scholars, however, suggest that overall, older people account for 12% to 24% of all emergency department visits (Samaras, Chevalley, Samaras, & Gold, 2010), while others confirm that the proportion of older users of emergency department services is higher than their proportion in the population (Chu, Brown, & Lukin, 2009; USGAO, 1993). Scholars have tried to find an explanation to the increasing presentation by the elderly to emergency departments by studying the possible contributing factors. Based on a large study in the USA of 4,310 patients aged 70 and older, Wolinsky and colleagues (2008) concluded that high-intensity emergency department users were more likely to be older, not living in rural counties, having greater morbidity, and possessing functional and psychological problems. Another view, however, based on a study of 2,936 patients (people aged 45 and over and grouped into three categories: 45-64 "older-adults", 65-74 "old" and over 75 "old-old"), concluded that there were no significant differences among the three groups with regard to socio-demographic characteristics other than age. To this end, the results of this study indicated only that the “old-old” used the emergency departments approximately twice as much as the “old” and “older-adults” (Carmel, Anson, & Levin, 1990).

In Australia, patients aged 65 and over comprised 17.7% of emergency department presentations in the period 2007-08 (AIHW, 2009) while they formed 13.1% of the total population (ABS, 2008). The Australasian College for Emergency Medicine (2004a), reports that older Australians are heavy users of not only emergency departments but all health care services. In Queensland, patients over 65 years comprised 14.6% of

emergency department presentations in 2007-08 which was 3% less than the average for the rest of Australia at 17.7% (AIHW, 2009). A report from NSW found that people 65 and over are far more likely to attend emergency departments in comparison to younger age groups who typically seek care at primary care settings (Booz Allen Hamilton Ltd., 2007). Contrary findings, however, have been reported by Chu, Brown and Lukin (2009), who examined the attendance trend for older patients in a major tertiary hospital in Brisbane. With an overall increase of 7.7% in the number of presentations to emergency departments during the four-year period between 2002 and 2006, the number of presentations by patients 65 years and older decreased by 3.1%. This result, which evidently goes against the grain, could be unique to the specific location of the hospital and catchment area according to the authors of the study.

Statistics are also not very consistent with the findings in relation to their effect on emergency departments by the younger population or by children. A study by the National Health Statistic Report from USA (Piits et al., 2008) identified that infants under 12 months of age were the highest age group per capita with 84.5 visits to emergency departments per 100 infants. Differing results, however, were reported by Reeder et al. (2002), who found that the number of patients increased during the 9 year period (1992-2000) in all age groups except for those less than 10 years old. Interestingly, some studies also report that the age group 22-49 years old showed a consistently high presence (Nawar et al., 2007).

The above review of research confirms that the demand for emergency departments is influenced by age, especially senior citizens, but also that there are no unified views on the question of how much impact on medical services is produced by certain age groups. In light of this, however, and together with the aging population across the globe and increases in life expectancy (United Nations, 2009), health care systems need to prepare for elderly patients to become a more significant part of the emergency department population. This is especially true given that older people presenting to emergency departments are "sicker and require more complex and time-consuming workups and treatment" (Future of Emergency Care in the US Health System Committee, 2007, p. 2). The growing presence of senior patients in emergency departments, does not translate into appropriate emergency care based on the unique needs of older adults (Hwang & Morrison, 2007; Wilber et al., 2006). There is an identified need for more patient-centred care which will allow for the

making of decisions based on the unique needs of elderly patients. Suitable care provided to this group of the population will also enhance the overall experience and assist in the provision of proper demand management within emergency departments (Shankar, Bhatia, & Schuur, 2013).

3.3.2.2 Gender

A number of scholars have attempted to delineate the characteristics of emergency department users to find any correlation between gender and utilisation rates for emergency departments. According to research currently available on these topics, however, the conclusions reached are not clear.

Reeder et al. (2002) has reported a significant increase, from 49.3% in 1992 to 53.6% in 2000, in the number of women presenting to the emergency departments. This study, however, was based on data collected from one rural tertiary hospital in the USA during a 2-week period in both 1992 and 2000, and also does not and cannot explain any general connection between gender and the demand for emergency departments. Contrary findings have been reported from Canada and Israel, where older men more often than women presented to emergency departments (Anson, Carmel, & Levin, 1991; McCusker, Healey, Bellavance, & Connolly, 1997). In the USA, younger males were found to access care through emergency departments for non-urgent conditions (Olshen & Soren, 2004) and mental health problems (Young et al., 2005) more frequently than females of the same age.

In Australia, men younger than 75, outnumber women in emergency departments every year according to government statistics (AIHW, 2005, 2006a, 2008a, 2008b, 2009). Interestingly, the proportion of men and women are almost equal in the Australian population.

Indeed, there are no extant studies to date which have attempted to explain this predicament and outline the possibly diverse reasons between males and females in their approach to emergency departments. Further, most studies to date often contrast the male/female ratio of service utilisation but do not compare these conclusions with the male/female ratio based on population data from the region in question. Regardless of these observed gender differences, there are no conclusive explanations for this occurrence and hence detailed analyses are necessary (Safdar et al., 2011).

3.3.2.3 Socioeconomic status and other factors

The relationship between selected socioeconomic factors and their impact on the demand for emergency departments has also attracted significant attention in various research projects. To this end, factors such as homelessness, ethnicity, marital status, living arrangements, and socio-economic status have been examined.

A community-based survey on homelessness and the marginally housed in San Francisco (Kushel, Perry, Bangsberg, Clark, & Moss, 2002) showed that factors associated with significant use of emergency departments include: less stable housing, victimization, arrests, physical and mental illness, and substance abuse. Further, according to National Health Statistic Report from USA (Piits et al., 2008), homeless people made 83.6 emergency department visits per 100 homeless persons. A number of studies show that low socio-economic status is intrinsically related to an increased demand for emergency departments (Ionescu-Ittu et al., 2007) and also confirmed that "highly deprived areas close to the accident and emergency departments generated high levels of work for both general practice and accident and emergency services, with no evidence of one service substituting for the other "(Carlisle, Groom, Avery, Boot, & Earwicker, 1998, p. 520).

A number of studies have examined the factor of ethnicity and its impact on the demand for emergency departments. Conclusions have revealed that African Americans utilise services twice as much as non-Hispanic whites and Hispanics, and almost five times more than "other" ethnic groups (McConnel & Wilson, 1998). According to the National Health Statistics Report from the USA (Piits et al., 2008), emergency department visits for black persons were almost double the rate for white persons in all age groups, whereas Asian or Pacific Islander persons had about half the visit rate as that of white persons. In a review of literature compiled by Thomas and Anderson (2006), it was noted that Aboriginal and Torres Strait Islander people attend emergency departments almost twice as often as other Australians and that they tend to be younger and have a lower socio-economic status. It is also reported that it was more likely that Indigenous patients would leave emergency departments without being seen compared with other patients (Mohsin et al., 2005).

Among the number of social factors described in the literature, the impact of marital status and living arrangements on the demand for emergency departments has also

been examined. The findings from an Australian study, showed that single women were more likely to present than single men, and while 84% of the patients lived in their own homes, women were more likely to live alone than men (Stathers, Delpech, & Raftos, 1992). Similarly, studies from USA, Canada, and Brazil supported a view that a lack of social support and living alone increases utilisation of emergency department services, especially by older groups of patients (Carret, Fassa, & Kawachi, 2007; Geller, Janson, McGovern, & Valdini, 1999; Han, Ospina, Blitz, Strome, & Rowe, 2007; Hastings et al., 2008). In light of the current tendency which promotes, among the elderly, staying and living in their own homes as long as they are able to, it could be expected that this factor may contribute even more significantly to the demand for emergency services (Lowthian et al., 2010).

All of the above factors place significant strain on emergency departments, although there are no clear means to quantify their impact on the demand or even to ascertain which factors play a more crucial role than others. Such details may also be exclusive to certain geographical areas, and hence organisational differences between emergency services, and thus any further studies have to be specifically designed for a particular population if proper examination of these factors is to occur.

3.3.3 Inappropriate users of emergency departments

An abundance of literature has been published on the inappropriate use of emergency departments. It is believed that the inappropriate use of these services causes challenges in access for real emergency cases, decreases the readiness for care, raises overall costs, and causes overcrowding (Cunningham, Clancy, Cohen, & Wilets, 1995; Derlet, Kinser, Ray, Hamilton, & McKenzie, 1995). The term is interchangeably used with non-urgent patients. Other terms popularly applied in the literature include misuse or abuse of emergency departments as well as references to non-urgent patients as primary care or GP patients.

3.3.3.1 Defining inappropriateness

There is, of course, a perennial and wide-ranging discussion of how to define the inappropriateness of emergency department services use. Some scholars have tried to define inappropriate users as those who do not require the specialised services and facilities offered in emergency department settings and those who could receive adequate care through their primary care providers and at lower costs (Bezzina,

Smith, Cromwell, & Eagar, 2005; Fish-Ragin et al., 2005; Liggins, 1993; Simonet, 2008; Williams, 1996). Triage classification has also been commonly used and widely refers to patients who were assigned a triage category 4 or 5 at the time of presentation as unnecessary (Durand et al., 2011; Mistry, Brousseau, & Alessandrini, 2008; Richardson & Hwang, 2001). For this reason, patients assigned category 4 and 5 are very often believed to be primary care patients who could conceivably be seen by their own GP or other practitioners. Single use of an urgency scale, however, is far from ideal in determining appropriateness of emergency department use, as it does not take into account the complexity of care required by patients. As noted by various scholars, even a non-urgent patient may require complex care that cannot be provided in out-of-hospital settings (Ardagh & Richardson, 2004; Nagree et al., 2013). This point of view is supported by other studies, which demonstrate that non-urgent patients still have some diagnostic or therapeutic intervention performed during their visits, and thus sole categorisation according to acuity does not constitute sufficient definition (Honigman, Wiler, Rooks, & Ginde, 2013). Bezzina and colleagues (2005) attempted to define the primary care patient based on emergency department utilisation rates. Low urgency and acuity, self-referred, and no admission to inpatient care were among basic criteria used to define appropriateness for emergency department services. In Australia, two similar methods were proposed. The first examined the difference between the discharge rates of self-referred patients and GP-referred patients, with calculations based on the self-referred, non-admitted, triage category 3, 4, and 5 patients (Sprivulis, 2003). The second method included self-referred, non-ambulance patients with a medical consultation time under one hour, that were believed to be possibly suitable for examination by primary care providers (ACEM, 2001).

There is no agreement, however, among scholars as to which method should be applied to define inappropriate use, and it is extremely difficult to estimate the number of inappropriate visits made to emergency departments. Interestingly, and depending on which criteria are used, 4.8% to 90% of the same group of patients can be classified as inappropriate (Bezzina et al., 2005; Durand et al., 2011). In general, lower numbers are reported when a single urgency classification is applied as opposed to higher numbers detected when retrospective criteria, such as final emergency department diagnosis, are used. (Cunningham et al., 1995; Mistry et al., 2008). Durand et al (2011), in their recent systematic review, stated that one of most

frequently used categorisations included possible delays in the provision of care and estimated that about 32.1% of emergency department visits could be classified as non-urgent. The same review, however, also confirmed that there is no standard methodology for determining the true proportion of general practice type patients in emergency departments. Other scholars, in the absence of definition for non-urgent visits, chose to report definite emergency department patients and estimated that vital interventions are required for less than 3% of all presenting to emergency departments (Gentile et al., 2010). In Australia recently, the Australian Institute of Health and Welfare started to include in the annual report a number of potentially avoidable GP-type presentations. Their definition is based on presentations made to public hospital emergency departments where the patient was allocated a triage category of 4 or 5, did not arrive by ambulance or police or other correctional vehicle, was not admitted to the hospital, was not referred to another hospital, and did not die. Based on these criteria, it has been reported that potentially avoidable GP-type presentations ranged from 41% to 38% between 2009–10 and 2011-12 (AIHW, 2011b, 2011c, 2012). This large proportion is believed by some scholars to be overestimated due to the methodology used which was based only on the urgency scale (Nagree et al., 2013).

Further, not only is there a lack of agreement on the particular methods, but the concept of inappropriateness is altogether rejected by some authors. Green and Dale (1992) were among the first opponents. In their study, primary care patients are prospectively identified (which was contrary to their previous studies where patients were retrospectively identified) based on triage systems and compared with groups of GP patients. The results of their study showed that primary care patients at emergency departments had a very different range of problems and circumstances to those patients who elected to visit their own GP. Other scholars rightfully point out that all of the proposed methods are "based on diagnosis or outcome, neither of which is predictable by the patient when deciding where to obtain urgent medical advice" (FitzGerald & Toloo, 2013, p. 573). It has also been reported by a number of studies that patients truly feel the urgency, seriousness of their condition, and consider emergency departments as the most appropriate place to seek care (Agarwal et al., 2011; Durand et al., 2012; Siminski et al., 2005; Toloo et al., 2013). Additionally, patients do not have the expertise to choose adequate health services

but act according to their feelings, often being in a vulnerable state and afflicted by unexpected illnesses. Other scholars note that the categorisation of emergency department visits cannot only depend on urgency and other patient characteristics, but also on the availability of alternative facilities for acute and unscheduled care. If there are no other alternatives in place for patients, emergency departments indeed are an appropriate place to seek timely care (Honigman et al., 2013). Further, there are no agreements between health professionals regarding any methods. Even when using the same criteria, health professionals frequently disagree about the urgency of care for patients in emergency departments (Gill, Reese, & Diamond, 1996). The findings from a New Zealand study found little evidence to suggest that there is agreement regarding this concept within individual professions, but much less between professions (Richardson, Ardagh, & Hider, 2006).

3.3.3.2 Characteristics and reasons of inappropriate users

Notwithstanding the difficulties outlined, inappropriate users remain a well-researched topic within the context of emergency departments. A number of studies have endeavoured to examine characteristics of inappropriate users according to different predisposing, enabling, and need factors. There is, however, a lack of consensus between scholars and their findings. Younger women have been reported to be more frequent non-urgent users of emergency departments in some studies (Bezzina et al., 2005; Sempere-Selva, Peiro, Sendra-Pina, Martínez-Espín, & López-Aguilera, 1999), while others have concluded that there were more male patients presenting with non-urgent conditions (Durand et al., 2012; Philips, Remmen, De Paepe, Buylaert, & Van Royen, 2010). Among other socio-economic factors, a higher level of education, absence of self-reported chronic diseases, lack of social support, and living in rural areas were all reported to have a significant bearing upon the inappropriate use of emergency departments (Afilalo, 2004; Bezzina et al., 2005; Philips et al., 2010; Sempere-Selva et al., 1999).

A large body of literature, in particular, has attempted to investigate reasons for which non-urgent patients attend emergency departments instead of seeking care in GP clinics or other out-of-hours services. The most common reason given by patients was their own perception of the severity and medical necessity associated with their health problem. In fact, many other researchers confirm that patients often believe their conditions were too urgent or complex for treatment elsewhere (Callen,

Blundell, & Prgomet, 2008; Masso, Bezzina, Siminski, Middleton, & Eagar, 2007; Murphy, 1998; Siminski et al., 2005; Singh, 1988). Similarly, a study from Perth confirmed that the self-referred patient group had the highest acuity profile among two other groups: GP and health-direct referred patients (Ng et al., 2012). Agreement between the perceptions of patients and staff has also been investigated. The results highlight an important division between the main reasons identified by both professionals and by patients. Clinicians were more likely to pass judgement from a perspective of a qualified person rather than from the perspective of those seeking medical attention based on self-assessed urgency and complexity, in the majority of cases without any medical training (Durand et al., 2012; Masso et al., 2007; Sanders, 2000).

A large number of patients present to emergency departments of their own initiative. There are many factors relating to why patients bypass primary care practitioners. One of the most cited is trust and belief that emergency department services are the most suitable for treatment of their conditions, followed by the convenience and affordability of these services (Callen et al., 2008; Durand et al., 2012; Gentile et al., 2010; Guttman, Zimmerman, & Nelson, 2003; Howard et al., 2005). In fact, the French study showed that patients were fully aware of alternative health care facilities but made their choices based on their own preferences (Durand et al., 2012). A lack of alternative health services or long waiting times before gaining access to them, together with the open door policy of emergency departments remain, however, an important factor for many other patients (Afilalo, 2004; Murphy, 1998; Sempere-Selva et al., 1999; Siminski et al., 2005).

Interestingly, a number of studies have revealed that patients who are classified as non-urgent come to emergency departments not only of their own volition, but on the referral of other health practitioners (Afilalo, 2004; Backman, Lagerlund, Svensson, Blomqvist, & Adami, 2012; Howard et al., 2005; Philips et al., 2010). This invalidates the argument that non-urgent patients should be seen and treated in out-of-hospital facilities.

The above review shows clearly that patients would seek care from emergency departments if they considered their condition urgent enough, or believed that their attendance was justifiable for any other reasons such as unavailability of alternate

care. The health care system should be designed to understand these needs and to provide adequate services. Patients should not be blamed for seeking care inappropriately when in need (FitzGerald & Toloo, 2013).

3.3.3.3 Inappropriate use among paediatric patients

In general, paediatric emergency departments face the same problems as emergency departments, including an increasing volume of patients and overcrowding. Some studies indicate that 58% to 82% of paediatric visits are for non-urgent conditions (Fong, 1999). Further, it is believed that many of these paediatric emergency department visits could be managed in primary care settings (Kini & Strait, 1998; Mistry, Hoffmann, Yauck, & Brousseau, 2005). To direct a greater number of paediatric patients to primary care facilities and ensure high-quality care for all children, it is important to understand why parents chose emergency departments for non-urgent conditions of their children. Research shows that diversion of non-urgent patients to primary care settings works for the short-term, but does not change the health care seeking behaviour (Gadomski, Perkis, Horton, Cross, & Stanton, 1995). For this reason, a number of studies have tried to ascertain factors that influence the decision to choose emergency departments over primary care facilities by parents for non-urgent conditions of their children.

One of the key reasons identified in the literature seemed to revolve around issues of convenience, quality, and access to care (Doobinin, Heidt-Davis, Gross, & Isaacman, 2003; Kubicek et al., 2012; Stockwell, Findley, Irigoyen, Martinez, & Sonnett, 2010). Among many other explanations, emergency departments were seen as a more ideal place due to the availability of resources such as laboratory tests and radiography as well as the general efficiency. Another advantage was related to better specialised and experienced staff in paediatric emergency departments who are able to provide a higher quality of care (Berry, Brousseau, Brotanek, Tomany-Korman, & Flores, 2008; Kini & Strait, 1998).

Problems with primary care providers were also identified as a major contributing factor to the demand for emergency department services. Parents indicated that they were not able to get appointments in time, had not received basic information on their child's illness, and experienced negative attitudes in the offices of primary care providers (Berry et al., 2008). A large number of responses indicated also that

despite their efforts to seek care outside of hospital, they were referred to emergency departments by physicians (Doobinin et al., 2003; Kini & Strait, 1998).

The perception of a true emergency and serious health condition still plays a significant role in coming to emergency departments despite a non-urgent triage category being assigned to young patients. Studies suggest that 33% to 63% of parents described the condition of their child as very or even extremely urgent and therefore decided to seek care via the emergency department (Doobinin et al., 2003; Kubicek et al., 2012).

Based on the above research, it is clear that strategies to decrease non-urgent visits to paediatric emergency departments must take into account a number of factors. Greater trust in the medical expertise of staff working in emergency departments, difficulties in accessing primary care facilities in a timely manner, and receiving quality care are some of the basic factors. Possible interventions should also focus on education for parents and the provision of relevant and accurate information on paediatric illnesses and action plans. Better educated parents will be able to choose more accurately the adequate health care facility to address their child's health issues.

3.3.4 Frequent users

The other, very popular topic among scholars related to the demand for emergency department services revolves around patients who frequently use these services. Frequent users are considered a source of high strain on emergency departments as they consume health care costs disproportionate to their numbers and contribute to overcrowding (Chan & Ovens, 2004; Lowthian et al., 2010; Milbrett & Halm, 2009). An examination of the relevant literature also reveals that there are various labels used to describe patients who use emergency departments often and repeatedly. Indeed, they are referred to as 'repeated attenders', 'frequent flyers', 'heavy users', 'frequent attenders', and 'super users' (Bernstein, 2006; Horst, Martin, Gambler, & Coco, 2011; Jelinek, Jiwa, Gibson, & Lynch, 2008; Malone, 1995).

3.3.4.1 Definition

The definition of the frequent user, however, is not clear and the lack of a numeric agreement for what constitutes the frequent user makes international comparisons very problematic (Byrne et al., 2003; Hunt, Weber, Showstack, Colby, & Callaham,

2006). Hunt and colleagues (2006) in their studies based on 49,603 individuals, examined the number of times patients had attended an emergency department in the past 12 months. Their results showed that 8% of respondents had visited an emergency department at least four times which thereafter became their yardstick for the definition of a "frequent user". This number, however, has not been widely accepted, and thus different studies, depending on their respective objectives, have used their own numbers of visits per year to identify frequent users. This has lead to a variation in definition of the frequent use from 2 to over 20 visits per year (Hansagi, Olsson, Sjöberg, Tomson, & Göransson, 2001; Jelinek et al., 2008; Olsson & Hansagi, 2001; Ovens & Chan, 2001; Ruger, Richter, Spitznagel, & Lewis, 2004). Depending on the study and the definition, frequent users can account for as little as 3.5% (Ovens & Chan, 2001) and as high as 97.4% (Jelinek et al., 2008) of all visits during a given period. Thus, given the lack of unified definition and agreement, the real impact of frequent users on emergency departments remains unclear.

3.3.4.2 Profile of frequent users

Despite the difficulties in definition, the profile of frequent users has been routinely studied by scholars in different countries for quite some time.

A number of studies have stated that factors such as the male gender, middle-aged and late–middle-aged, self-referred, mental and/or behavioural disorders, alcohol intoxication, arrival by ambulance or higher levels of deprivation were independently associated with a greater readmission risk within the subsequent twelve month period from an initial emergency department presentation or admission (Fuda & Immekus, 2006; Jelinek et al., 2008; Lyratzopoulos, Havely, Gemmell, & Cook, 2005). Researchers also reported that only 15% of frequent users were uninsured or were Medicaid patients and members of minority groups, although the majority of frequent users were white and had Medicare or other private health insurance (Fuda & Immekus, 2006; Hunt et al., 2006; Tang, Stein, Hsia, Maselli, & Gonzales, 2010).

Ruger and colleagues (2004) established that frequent users of emergency departments are a heterogeneous group. Further, the vast majority of patients who visited emergency departments frequently and presented with serious illness were triaged as "emergent" and required hospitalization. The same argument has been presented by other scholars, who state that frequent emergency department users are generally more sick than infrequent or non-users, and possess considerable mental

illness and substance abuse problems (Bernstein, 2006; Fuda & Immekus, 2006; Hansagi et al., 2001). Conversely, studies suggest that patients who made over 20 visits per year appeared to be 'less' sick and were diagnosed as having non-serious conditions. This group of patients, however, accounts for a mere 1% of all emergency department visits (Jelinek et al., 2008; Lyratzopoulos et al., 2005).

Frequent users were more likely to be found being transported to emergency departments by ambulance, although frequent users of psychiatric units typically opposed the use of ambulance services when compared to non-frequent users. The reasons behind such findings remain unexplained and may indeed be specific to this study (Scott, Strickland, Warner, & Dawson, 2013).

Interestingly, studies suggest that frequent use of emergency departments is a temporary phenomenon, as only 25% to 28% of frequent users will remain frequent users in the following year (Fuda & Immekus, 2006; Lyratzopoulos et al., 2005).

3.3.4.3 Reasons behind frequent use of emergency departments

There are number of studies from the USA that suggest the lack of access to primary care causes patients to use emergency department services repeatedly (Grumbach, Keane, & Bindman, 1993; McCusker et al., 1997; O'Brien et al., 1997). Such a statement has not been confirmed by other studies from different countries, which allow free access to primary care. Indeed, a number of authors have concluded that patients frequently visiting emergency departments are also high users of other medical services (Byrne et al., 2003; Hansagi et al., 2001; Ovens & Chan, 2001). These patients also typically had linkages to outpatient care that were comparable to non-frequent users of emergency departments (Billings & Raven, 2013). Additionally, a Swedish study indicated that almost 72% of frequent users made primary care visits, their admission rate was 80% and, in addition, they had an elevated mortality rate (Hansagi et al., 2001). These findings have added significant knowledge to the subject especially in light of its suggestion that access to free primary care would reduce the demand for emergency department services.

Frequent users were found to be more likely to suffer from non-trauma events or medical conditions, have poor physical health including chronic diseases, and be more likely to make a mental health, alcohol, or drug-related visit (Brunero, Fairbrother, Lee, & Davis, 2007; Hunt et al., 2006; Liu et al., 2013; Mandelberg,

Kuhn, & Kohn, 2000; Sandoval et al., 2010; Vinton, Capp, Rooks, Abbott, & Ginde, 2014; Wu et al., 2012). Interestingly, some scholars suggest that alcohol-related presentations, especially during the evenings and weekends, are by far the leading category among frequent users with mental health, alcohol, and drug-related presentations. They suggest further that management strategies should be focussed on patients with frequent alcohol-related visits (Liu et al., 2013; Patton, 2013). Additionally, a study from Australia found that asthma severity together with the lack of a written asthma action plan and coping mechanisms, were contributing factors to the frequent use of emergency departments (Adams, Smith, & Ruffin, 2000). One study found that two thirds of repeated presentations took place either during the evening or night shifts, which could suggest limited access to out-of-hours care particularly at this time in the day (Milbrett & Halm, 2009).

Few qualitative studies articulate the reasons behind the repeated use of an emergency department from the perspective of patients. As such, the results show that frequent users perceive pain or other symptoms as a threat to their life, and this anxiety leads them to seek urgent care (Milbrett & Halm, 2009; Olsson & Hansagi, 2001). A study from Chicago asked a group of 69 frequent users and a controlled group of 99 infrequent users in structured interviews to articulate their reasons for seeking care in an emergency department. The findings showed that frequent visitors to emergency departments have higher levels of stress, lower levels of social support, worse general health status, have depression, are insured, and have a primary health physician (Sandoval et al., 2010).

The examination of the literature demonstrates that frequent users of emergency departments are a heterogeneous group. An identification of the characteristics and reasons behind frequent presentations to emergency departments are required in order to develop predictive models. Identification of who will become a repeat emergency department user will assist in instituting target interventions. Strategies focusing on managing patients with frequent alcohol-related visits may be necessary. The reduction of frequent visits to emergency departments should, however, be viewed as only one component of a more comprehensive intervention needed for implementation in order to decrease the number of frequent users across all health system facilities.

3.3.5 Health system-related factors

The health system-related factors that affect emergency department services may be many and varied, among which few are well documented. For the purposes of this literature review, the availability of alternative health care services, insurance status of patients, as well as patient awareness of the services and individual approaches to their health status, will be discussed.

3.3.5.1 Lack of alternative services

A large and growing body of literature has investigated how access to alternative care influences the demand for emergency department services. The results of a number of studies to date reveal that limited access to primary care physicians, the declining rate of access to non-hospital medical services, and community nurses has contributed to an increased level of demand for emergency department services (Callen et al., 2008; Ionescu-Ittu et al., 2007; Lowthian et al., 2010; McGaw, Jayasuriya, Bulsara, & Thompson, 2006; Reeder et al., 2002; Thompson, Hayhurst, & Boyle, 2010). This is, however, not a unified opinion as other studies have found that the availability of alternative services offering first contact care for patients is likely to have a marginal effect on the demand for emergency department services (Coleman, Irons, & Nicholl, 2001). This view is corroborated by Hanson, Sadlier and Muller (2004), who noted that the establishment of two bulk-billing GP clinics in Mackay, Australia, did not result in a measurable reduction in the absolute number of emergency department presentations.

More specifically, the relationship between access to primary care and localisation has also been studied by Sprivulis, Grainger and Nagree (2005) in four inner- and three outer-metropolitan hospitals in Perth, Australia. The results showed that inner-metropolitan emergency departments experienced low rates of attendance with low acuity patients especially during working hours. This is contrary to outer-metropolitan emergency departments which received a higher number and constant stream of low acuity patient presentations. Similar findings show that emergency department visits may be reduced by increasing the availability of alternative facilities in areas with a limited access to primary care services, even though increased availability in areas with good access to other facilities will not reduce emergency department visits (Chana, Linb, Yangc, & Huanga, 2013). Other research outlines certain actions taken by patients prior to presentation at emergency

departments and found that the majority of patients attempted to contact their GP or out-of-hours facilities in the first instance (Benger & Jones, 2008; Han et al., 2007). These results show that simply increasing the number of alternative services will not resolve the high demand for emergency department care, as patients seek professional help from primary care service providers prior to presentation to a hospital.

Many private and public health services around the world, as well as in Australia, have introduced telephone health services serviced by experienced staff. This was instituted to provide convenient access to appropriate health advice and information available 24 hours, seven days a week. A study from Western Australia (Sprivulis, Carey, & Rouse, 2004) examined the impact of these types of services on the demand for emergency department presentations. The results showed that only 6.5% of emergency department visitors made prior contact with a telephone advisory line. To this end, the decision to attend an emergency department was based on factors independent to telephone advice, and calling prior to visiting an emergency department is also not associated with more appropriate emergency department attendance. Richardson and Mountain (2009), in their discussion about myths versus facts in emergency department overcrowding, strongly advise that telephone advice lines and general practitioners do not reduce the emergency department workload in Australasia.

All of the above-referenced studies strongly suggest that access to alternative care does not directly impact on the demand for emergency department services. This relationship, however, requires further investigation as other sources such as the Australasian College for Emergency Medicine (2004a) have reported that the decline in aged care facilities (such as nursing homes) together with the number of GPs as well as the number of bulk-billing clinics, will put the pressure back upon acute sectors of the health care system.

3.3.5.2 Insurance status

Some scholars associate an increasing demand for emergency department services with a lack of health insurance (Olshaker & Rathlev, 2006), which is a well-known problem in the USA. Ragin and colleagues' (2005) have reported that among the top five reasons their research participants stated for attending an emergency department were affordability (25%) and the limitations of insurance (15%). Different

conclusions, however, have been reached in two studies (a national population-based study and the National Community Tracking Study Household Surveys) undertaken by Weber et al. (2005; 2008). In both of these reviews it was found that uninsured individuals were no more likely to have an emergency department visit than insured individuals, but poor physical and/or mental health, more outpatient visits during the year, and medical care being sought by a physician contributed to higher emergency department use. A qualitative study from Canada comprised of individuals from different backgrounds and experiences in emergency department services supports this view, as free access to primary care based on universal health insurance was not considered to be an important factor (Schull et al., 2002).

For health care systems such as that found in Australia, however, the lack of health insurance cannot be a reasonable explanation for attending an emergency department, especially where the vast majority of people have access to the nation-wide Medicare system. Supporting this hypothesis is the fact that bulk-billing rates by GPs, as an indicator of the affordability of medical care, has been on a rise for the past few years (Toloo et al., 2011). GP consultations, however, do not cover extra costs (e.g. X-rays, pathology tests, and medication) and an increasing number of GPs charging additional fees may have an impact on a patients decision to present directly to an emergency department where all these costs are absorbed by the medical system (Lowthian et al., 2010) .

3.3.5.3 Awareness of patients

Individual perception leads people to execute certain actions and behaviours. The preference for attending an emergency department over seeking care somewhere else is no exception to this maxim. Patients expectations, knowledge, and awareness has changed over the past decades (Lowthian et al., 2010). Public health and marketing campaigns have raised general health literacy and influenced people's approaches to their own health. Nowadays, patients believe and expect that any health problem should be dealt with reasonably soon and can be resolved quickly. Easier access to health information through media such as the internet (e.g. the so called "Google doctor"), health campaigns, advisory lines, advertisements, promotion, and over-the-counter medications, has created a new society of patients. They use medical goods and services which they believe are most appropriate for them and without any delays (Gabe, Bury, & Elston, 2004). Findings of other studies suggest also that

health promotion campaigns not only address their goals, but also increases expectations for immediate care, particularly when patients perceive an urgent need for their condition (Abernethie & Nagree, 2004; Lowthian et al., 2010). Han and colleagues (2007) reveals that patients believe that an emergency department is able to provide better care than they could possibly receive via primary health practitioners. Many patients also regard their health condition as quite serious and thus prefer to attend an emergency department, which is equipped with the necessary personnel and technical facilities and can cure their problem as soon as possible. More specific research is needed to explain the true impact of these factors on the demand for emergency department care and to fully understand the perspectives of patients and their reasons.

3.3.6 Summary of literature review

The literature reviewed above has attempted to present current and published research related to the topic of demand for emergency department services. The first section provided an overview of concepts related to the area. The second section examined the literature published around the topic. The background literature highlights a number of issues in relation to the quality of studies, individual and specific matters related to various health care systems, multiple factors influencing the demand, and the general lack of a conceptual approach.

As such, one of the most evident problems revealed relates to the fact that various studies offer different definitions and measurement tools. Further, a large number of studies reviewed are limited in scope to small geographic locations or to a small number of participants, which impedes the drawing of wider comparisons and/or the formation of general conclusions. Relatively few rigorous qualitative studies identified by this review, have examined the perspectives of patients and provided insights into understanding their reasons to present to emergency departments.

Further, it was also clear from the literature that an increase in demand for emergency department services could be observed across all health care systems in the world. The differences among the various systems, however, exists due to the fact that various factors place differing impacts on the demand for emergency department services depending on the structure and organisational components of the health care system in place.

Additionally, multiple factors such as an aging population, low socio-economic status, poor health, and lack of access to alternative health facilities at different points of time have been repeatedly cited as contributing to the increased demand among various groups of users. All of the above factors place significant strain on emergency departments, although there are no clear means to quantify their impact on the demand or even to ascertain which factors play a more crucial role. This review testifies to the complexity of the problem and recognises that a unified approach to the identification and quantification of these factors is needed.

As discussed in the review, only a few studies have taken a systematic and comprehensive approach to research in this area and included a combination of socio-demographic, economic, individual, and system-related factors to determine any impact on emergency health services. None of the studies, however, applied a comprehensive theoretical framework, which would integrate evidence from the literature and propose a conceptual framework to organise the large number of possibly influential factors.
Consequently, the current research study aims to fill a void and provide a conceptual framework based on existing theories from across disciplines and the materials discussed in the above literature review. The proposed framework will facilitate this understating and is discussed in detail in Chapter 4.

This is especially needed as policy makers, managers, and health professionals face the challenge of providing adequate and satisfactory services for patients. To be effective in current health care system management, they are required to possess an integrated and comprehensive understating of the issues influencing the existing situation.

Chapter 4: A model for emergency department services use

4.1 INTRODUCTION

A multitude of factors have been identified as impacting on the demand for emergency department services, as has been indicated in the literature review. It is, however, very difficult to understand which determinants are the most critical in patients' decisions to utilise health and emergency services. An extensive list of factors such as culture, economics, access, perceptions, beliefs, knowledge, age, gender, and social roles are all recognised as influential in seeking health care. Therefore, a conceptual framework within which to organise and synthesise these broad factors is recommended (Boudreaux, Cydulka, Bock, Borrelli, & Berstein, 2009) and needed for this research.

In an effort to facilitate an understanding of the utilisation complexities in emergency departments, the sections below seek to:

- explain theoretical approaches to health care utilisation;
- identify key variables connected to health care utilisation;
- recognise the sources of variability in health care utilisation; and
- provide a rationale behind the proposed theoretical framework for this study which will be developed based on an amalgamation of the models and theories discussed, as there are currently no specific models adopted for the utilisation of emergency health services.

4.2 THEORETICAL APPROACHES AND MODELS

This section will provide a brief overview of theories and models selected for the purpose of this research alongside their common themes, differences, and deficiencies. It is useful to remember that the selected theories consider decision points or stages of health care seeking, where models contain sets of interacting variables (Rebhan, 2013). The ensuing discussion will explicate the rationale behind the choice and adaptation of

certain elements of various health behaviour theories and models for the current research project.

4.2.1 Health Belief Theory and Model

There are a number of accounts as to what constitutes "health behaviour." David Gochman, one of the most notable contemporary scholars in the field, defines health behaviour as "…overt behavioural patterns, actions and habits that relate to health maintenance, to health restoration and to health improvement" (1997, p. 3). This is, however, a very broad definition within which many tangentially related concepts pertaining to the collocation of health and behaviour can fall. Indeed, health behaviour encompasses a large field of study which intersects with a diverse range of disciplines from public health and epidemiology, to sociology, psychology, anthropology, and education. Further, this definition implicitly highlights the hegemony of the individual. From a public health viewpoint, however, the individual is contextualized with respect to a community. This notwithstanding, the actions of the individual affect the conditions of the entire community thus interrelating both perspectives. In view of the above, an all-encompassing definition of health behaviour would perhaps refer to the "actions of individuals, groups, and organizations, as well as the determinants, correlates, and consequences, of these actions—which include social change, policy development and implementation, improved coping skills, and enhanced quality of life" (Breslow & Cengage, 2002).

Returning to the assertion of Gochman, his definition is essentially predicated on the delineation and description of precise groupings of overt health behaviour identified in the pioneering work of Stanislav Kasl and Sidney Cobb (1966). For Kasl and Cobb, health-related behaviour can be divided into three categories:

1) Preventative health behaviour (eg., preventing disease through positive action);
2) Illness behaviour (eg., seeking remedy through medical assistance);
3) Sick-role behaviour (eg., aiding recovery through rest or prescribed medication).

While these basic categories are still current and effectively classify health-related behaviours, some mixture and overlap among them together with the need to accommodate contemporary issues in health has generated numerous new categories.

The above tripartite division of Kasl and Cobb enables a direct connection with emergency health services. As such, this research project deals with health-related behaviour which falls within the ambit of an illness behaviour, where a cure or treatment is sought in crisis situations through a presentation to an emergency health service.

There are many factors which impact on health behaviours. These can be classified in broad terms by separating those factors intrinsic to the individual (such as socio-demographical, social support etc.) from those extrinsic to the individual (such as legal restrictions) (Conner & Norman, 2005). The first group of factors has been studied for a considerable length of time now by scholars in fields as diverse as epidemiology, psychology, sociology, and public health. Models of how such intrinsic factors influence various "health behaviours" are commonly known as health behaviour models. Health behaviour models have been widely used by health professionals and researchers as they provide a clear picture of those who exercise or initiate health behaviours. The second group of factors (extrinsic) can be used to engender behaviour change, if such a change is warranted, based on information articulated earlier in relation to health behaviour theories and models. Therefore, understanding the relationship between the myriad factors influencing health behaviour and its performance can certainly suggest targets for intervention if change in health behaviour is desired.

There are specifically designed health behaviour models that are widely used to explain certain health-related behaviours. The Health Belief Model was one of the first and most frequently used theoretical frameworks in research predictions of patients' behaviours (Bowling, 2002; Glanz, Rimer, & Viswanath, 2008; Rebhan, 2013). In the 1950s, scholars from the USA spurred the development of this model which was aimed at increasing the usefulness of health education programs. It was well-known that demographic and socioeconomic variables were associated with preventative health behaviours and the use of health services, but these could not be reformed through health education. Beliefs, on the other hand, provided the necessary link between socialisation and behaviour due to its intrinsic ability to shape the behaviour of an individual. Even more significantly, perhaps, is the fact that beliefs are able to be modified (Abraham & Sheeran, 2005). These models

include health-protective behaviours such as screening clinic attendance or exercise programs, and avoidance of health-harming behaviours such as smoking or excessive alcohol consumption.

There are six main components of the health belief model as illustrated in Figure 4.1, which defines patients' behaviours. “Perceived susceptibility” refers to a person's belief regarding their chances of contracting a disease or medical condition, while “perceived severity” relates to a person's feelings about the probable consequences of resulting illnesses. These two form a perception of threat. Two other elements of the model deal with “perceived costs and barriers” on one side and the “perceived benefits” on the other, as any behaviour is highly influenced by these two components.

In addition to the above, cues to action became part of the model as it can and must activate behaviour. This part of the model, however, has not been widely studied as the concept itself is difficult to measure. Similarly, a “self-efficacy” element was added to the model in the late 1980s, as there was evidence that self-efficacy is especially important in the initiation of behavioural change. Indeed, people need to feel competent to overcome barriers prior to taking any action (Champion & Sugg Skinner, 2008).

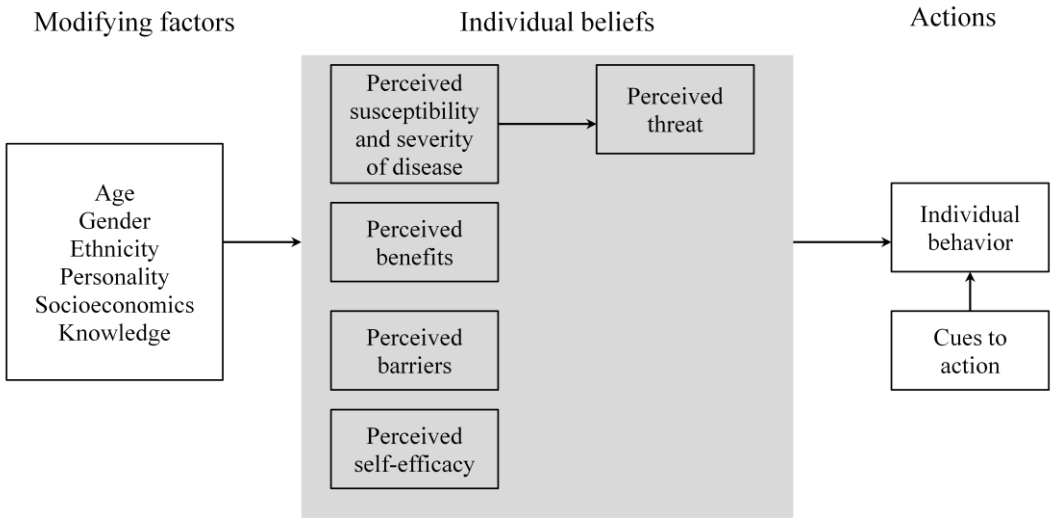


Figure 4.1 Health Belief Model Components and Linkages

Note. From " *Health Behavior and Health Education: Theory, Research and Practice*", by K Glanz, B. Rimer, & K. Viswanath, 2008, (4th ed.), San Francisco: Jossey -Bass, p. 49. Copyright 2008 by John Wiley and Sons. Reprinted with permission.

For the past few decades, the Health Belief Model has provided a useful theoretical framework for the study of different kinds of health behaviour. One of the major advantages of the model is the simplicity of its main constructs, which can be easily and inexpensively put into operation and employed in questionnaires. Application of this model to emergency department settings will include patients':

- belief that they have urgent and serious conditions;
- belief that the consequences of conditions are serious;
- belief that preventative action such as prompt presentation to an emergency department will improve their health outcome;
- identification that benefits such as reduced risk and complications will outweigh potential barriers such as cost of transport to services, absence from work, or waiting times;
- belief in their own ability to take effective action such as identify the emergency department as an appropriate place to come for their current, often unexpected health condition.

Despite the impressive record of research conducted based on the Health Belief Model, there is also some concern regarding the measurement of Health Belief Model elements, particularly as there is no specifically tested and validated measurements of the above-defined concepts. Many investigators have developed their own research instruments, but universally standard measures are not currently available, and a broad range of instruments are not comparable. The model also does not account for cognitions that are known to be a powerful predictor of behaviour (Abraham & Sheeran, 2005; Janz & Becker, 1984). Nonetheless, beliefs about susceptibility, benefits, or barriers of treatment may be influential in sustaining or discontinuing action.

4.2.2 Health care utilisation theories and model

People perceive their health status, symptoms of any illness, and even pain in very different manners, and respond to it in various ways. Some individuals access health services frequently and present themselves to a doctor even with rather trivial symptoms while others fail to seek help with serious and possibly life-threatening conditions. This

suggests that health seeking behaviour is influenced by other factors including social and cultural considerations in addition to existing or, in some cases, imaginary physical conditions.

The first theory which attempted to define individual behaviours of people who become ill was proposed by Talcott Parsons (1951). It is known as a "sick role theory" and concentrates around four main components which could be summarised into two major groups: 1) persons rights; and 2) persons responsibilities (Segall, 1976). As such, firstly the individual is not responsible for their state of illness. Secondly, they are excused from performing normal, social roles and tasks. On the other hand, the individual is expected to seek medical assistance and to comply with medical treatment in order to get well again.

Parsons' conceptualisation of the sick role was later described as an ideal model and theory of the sick role, and still holds its value as an explanatory concept. The main criticism of the sick role theory points to a number of limitations including:

- the inability to account for considerable variability in behaviour among sick persons acknowledging that variation occurs not only due to an individual's characteristics such as age, gender, and ethnicity, but also because of the certainty and severity of the prognosis;
- the lack of applicability to an individual's behaviour with chronic conditions;
- the lack of applicability to the variety of settings in which physicians and patients interact; and
- its applicability to middle-class patients and their values as opposed to persons in lower socioeconomic groups.

Consequently, scholars over the ensuing decades proposed multifaceted models and theories to identify factors influencing health care seeking by sick individuals (Wolinsky, 1988b).

The general theory of help-seeking proposed by Mechanic (1978) defines illness behaviours as "any state that causes, or might cause, that an individual becomes concerned for his or her symptoms and seeks help". This theory allows variations in illness behaviour and helps facilitate an understanding of the assessment process and

how individuals act prior to (or instead of) seeking medical care. It is oriented also towards two factors: the perception of the health situation and the ability of the individual to deal with the situation. Mechanic defines illness behaviour as a culturally and socially learned response formed through learning, socialization, and past experience (Rebhan, 2013). Mechanic's theory takes into account for the first time role of other people who can influence individuals responses to illness and their health-seeking behaviour. Models based on his theory are suitable for predicting decisions made by an individual about contacting (or non-contacting) health care facilities but it does not explain the later stages of health behaviour. Therefore, two other models based on the theory of help-seeking were introduced by Edward Suchman and Roland Andersen and will be used for this research.

Suchman's model of illness and medical care includes five stages of illness behaviour which enables monitoring of all stages of illness behaviour and facilitates an understanding of an individual's decision-making processes as to whether to access health care services or not (1965).

Stage one of that model concentrates on symptoms that an individual experiences at this early phase when they sense for the first time that something is wrong with their own bodily functioning. According to Schuman's theory, three distinct processes take place at this time. These include the experience of pain or discomfort, cognitive recognition of an illness, and an emotional reaction associated with assessment of the illness including the potential interruption of daily activities (Wolinsky, 1988a). The response for an individual to this initial stage may include on the one hand the denial of sickness beginning, or on the other hand acceptance of symptoms which leads to the second stage. Individuals who cannot subscribe to either of the above groups delay making the decision and wait for further development of symptoms.

Assumption of the sick role is the second stage, during which the individual accepts the symptoms as a sign of illness and makes a transition to the sick role as introduced earlier by Pearson. The ill person seeks validation for the sick role from other persons and explores a referral system that is put in place. Acceptance from others of illness and the provisional sick role leads to the third stage where the individual makes contact with medical services. During this stage, an ill person leaves lay remedies and enters the professional care system. The pace, however, at which an

individual enters this stage depends on their own circumstances and views (Wolinsky, 1988a). Today, there are a variety of options through which patients can seek different forms of care including the increasingly widespread practice of self care. Thus, the importance of the individual's social and cultural environment is often emphasised in actions and decisions that they make. Upon confirmation of illness by medical professionals, the individual is able to enter the next stage.

Stage four begins when an ill person accepts professional health care treatment and assumes a dependent-patient role during which it is expected that they make every effort to get well. Patient and physician work together on recovery, and gradually the patient is able to resume roles that he or she performed before the sickness commenced. Some people, however, see the benefits of this stage (eg. increased attention or escape from normal responsibilities) and attempt to prolong their stay in this role. Eventually, the patient will either get better and be ready to move on to the next stage or terminate the treatment, especially when there is a disagreement between a patient and professional health care provider in which case an individual can choose to seek alternative treatment options.

The final stage, recovery and rehabilitation, allows acute patients to move back to normal role activities upon relinquishing the sick role. Chronic patients, however, may assume a chronically ill role.

The two first stages of illness behaviour described by this model can be specifically useful in understanding a patient's pathways to the emergency departments. During these early phases, a patients' recognition, perception of their own health problem, and consequent decision where to seek care from is established. It also helps to explain the variation between patient's who decide to come straight into the emergency department for care and others who wait and contact other services or try to manage their symptoms on their own.

In addition to Schumann's model, Andersen (1968) developed a model of health care utilisation in the late 1960s which became very successful in describing the variance in health services utilisation by patients. This model incorporated unique analyses of the determinants of medical care utilisation into three components:

1) Predisposition about healthcare with respect to socio-demographic variables, attitudes, and beliefs. According to Andersen, patients are more or less likely to use

health care services based on these characteristics. For example, patients who have a high opinion and belief in health services will more likely use it when they are in need.

2) Enabling factors such as family income, health insurance coverage, availability of services, and access to a regular source of care. These are factors found within the family and community.

3) Need-based characteristics such as health status, disability, or diagnosis. This category includes the perception of need for health care regardless of whether it is individual, social, or clinically evaluated need.

Andersen's model was subsequently modified. In the 1970's health care system, health policy and resources and organisation was added (Andersen & Newman, 2005) as illustrated in Figure 4.2. It was specified that recourses consist of the volume and distribution of labour and capital, where organisation referred to health care system management which directly influences structure and access to health services for patients (Rebhan, 2013). It was an important addition and emphasised the fact that an individual will use health services only if satisfactory labour forces and resources are put in place.

Further revisions to the model were undertaken during the 1980's and 1990's, and the linear relationships between the components were highlighted. Primary determinates such as population characteristics, health care system, and external environment remain important variables for understanding the use of health services in the model. While individual health behaviours including personal health practises such as diet, exercise, and self care were recognised as interacting factors for the use of health services and ones that influence health outcomes. The model added the health outcomes including perceived health status, evaluated health status, and consumer satisfaction, which showed that health service utilisation outcomes, in turn, affects predisposing factors, the perceived need for services, together with health behaviour (Andersen, 1995).

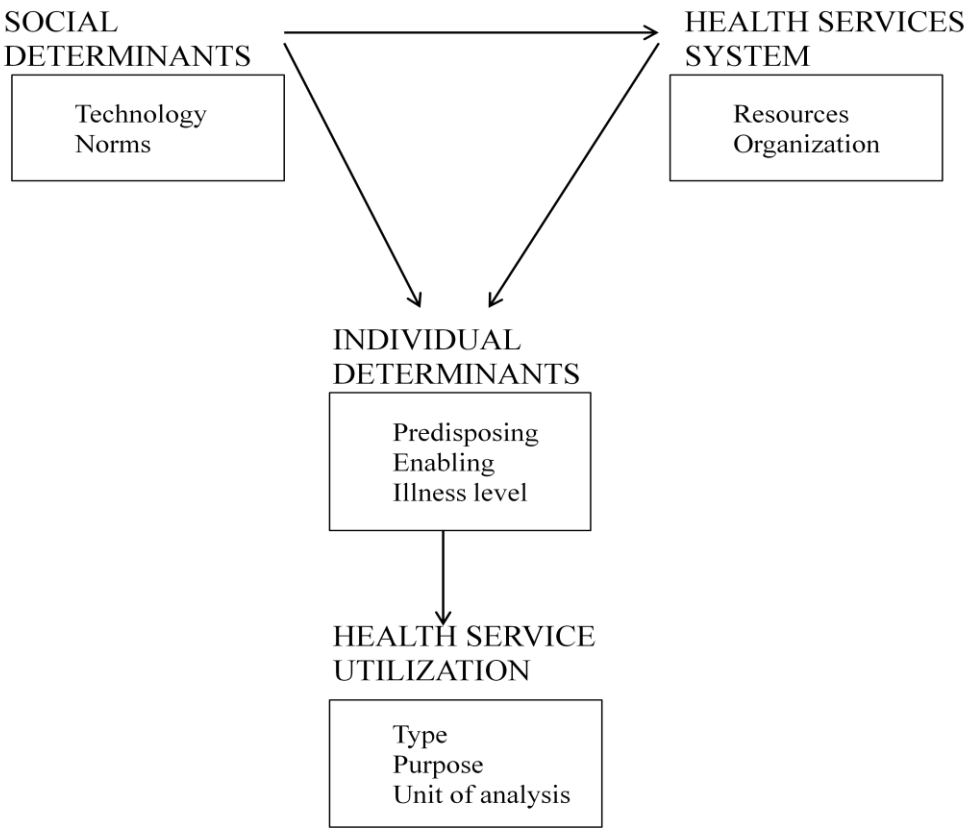


Figure 4.2 Framework for viewing health services utilisation

Note. From "Societal and Individual Determinants of Medical Care Utilization in the United States", by R. Andersen & J. F. Newman, 1973, *The Milbank Memorial Fund Quarterly: Health and Society*, *1(51)*, p. 98 Copyright 1973 by John Wiley and Sons. Reprinted with permission.

Andersen's model has been applied across various countries and studies (Aday & Awe, 1997; Andersen, Chen, Aday, & Cornelius, 1987; Shankar, 2000), and empirical data is now available to predict and explain the variety in health care utilisation behaviours (Andersen & Newman, 1973). There have been, however, a number of criticisms of the model, which relate to the definition of measurements of the predictors and indicators. There is also a need for testing of the relationships shown in the model as well as further empirical studies that would explain the variations in health care utilisation (Gochman, 1997). Andersen's model also does not consider the kind of health care used. As such, it does not take into consideration the emergency services. It can be useful, however, for the current research project, especially the inclusion of factors that relate to patients' perspective. Beliefs as well as previously mentioned health outcomes that can play a significant role for patients who frequently use emergency departments should be incorporated in the current study.

4.2.3 Other models and theories of health care utilisation

Angelo Alonzo (1984) developed the situational-adaptation illness behaviour model, which consists of four types of illness behaviours: everyday, acute, chronic, and life-threatening illness behaviour. This theory in essence is not about disease but the way disease manifests itself in everyday life situations. The author specifies and differentiates processes that accompany the seeking of care according to the abovementioned four types. As such, everyday illness behaviour represents individuals who, while experiencing difficulties, are still able to participate in daily routines and generally do not require care from professionals. Examples of symptoms include cough, cold, headaches, swelling, stiffness, aches, skin disorders, fatigue etc. Individuals are typically able to cope with these transitory symptoms, although they could sometimes indicate more serious conditions or the beginning of chronic disease. Such a conceptual framework of everyday illness is seen as being beneficial for research methodologies in general practice settings (Gannik, 1995).

Chronic illness behaviour is characterised by a lack of a cure together with a long duration and frequent exacerbation or reoccurrences (Lavietes, 1974). In these cases, patients concentrate on the management of the disease and avoidance of situations or activities that aggravate signs or symptoms of the illness. Medical care is provided to chronically ill individuals generally in a long term relationship with medical professionals as opposed to guidance-cooperation relationships for acute illness patients (Alonzo, 1984).

Acute illness behaviour consists of individuals who find their signs and symptoms impossible to control by self-care, previously received medical advice, and/or lay competencies. In many cases the individuals find themselves frightened and worried in which case they actively seek medical consultation and utilise professional resources to bring the symptoms under control (Alonzo, 1980). Lastly, life threatening illness behaviour includes situations characterised by emerging crises that are not resolved until definitive medical care is obtained. The individuals have no alternative and need expeditiously to seek professional care in order to preserve life or body functions. Therefore, it was commonly assumed in the illness behaviour literature that social processes accompanying life- threatening situations do not need to be studied. Alonzo (1984), however, suggests that these four types of illness behaviours can occur individually or simultaneously. Based on empirical studies surrounding coronary artery disease (Alonzo, 1986; Dracup et al., 1995), he argues

that patients experiencing life threatening illness often have multiple conditions and must manage numerous problems. Consequently, life-threatening illness behaviour should be broadly studied within its social situational context taking into consideration the social network, especially family and spouses, who often make the decision on behalf of the people experiencing life-threatening situations.

Elements of the above-mentioned model will be applied to the current research project and will include patients' onset of presenting health problems, existence of other health conditions, as well as elements of social support including accompanying the person and including those that made a decision to seek care from an emergency department.

The second model, which brings noteworthy elements to this study, is Young's choice-making model. Based on his own research among ethnic Mexicans, Young proposed the choice-making model for health care utilisation which predicts a notable 94.7% of utilisation behaviour (Young & Young-Garro, 1982). There are altogether four components of this model: gravity of illness, knowledge of home treatment, faith in treatment, and access to treatment (Young, 1981). The first three concepts essentially relate to pre-hospital actions and include the individual and social network, perception of illness severity, knowledge of a home remedy that could be used effectively before entering professional care, and incorporating an individual's belief in the effectiveness of a home remedy. In other words, if a sick individual or the community knows and believes in a home treatment they will be likely to utilise it before seeking professional care (Kleinman, 1980; Wolinsky, 1988a). The fourth component of Young's model, however, includes the accessibility of treatment, cost considerations, and the availability of health services. According to the author, this may be the most important and influential factor for people who decide to utilise health services (Young, 1981). It has been noted that both costs associated with the utilisation of professional health services as well as expenses relating to transportation and time needed to access medical care are likely contributors to the decrease of accessibility of the health care services (Taylor, 2003; Young & Young-Garro, 1982).

In regards to current research, the availability of other health services, costs associated with access and convenience of emergency department services will be studied within the proposed theoretical framework. This would seem especially important as issues

associated with availability and accessibility of emergency departments were raised and extensively examined in the literature review (see section 3.3.5).

4.2.4 Social support and social network

In addition to the abovementioned theories and models, the social support model will be incorporated and tested within the proposed theoretical framework.

The concept of social support originates from Norway in 1954, when Barnes attempted to describe and explain the patterns of social relationships that were then considered unfathomable via the discussion of such factors as family and work groups. It was only in 1976, however, that John Cassel established a definition for social support as being a key psychological factor and influence on the incidence and prevalence of a range of health outcomes (Heaney & Israel, 2008). This notion has been widely tested and there is agreement among scholars that social relationship, social support, and social network are indeed all associated with various health outcomes (Bosworth & Schaie, 1997; Umberson & Montez, 2010).

The theoretical models of social support are categorised via provider models and consist of two major components: social support and network support. The categorisation is a particularly important notion as social support, with reference to the theoretical models, is a dynamic process that includes interactions between provider and recipient as well as individuals, network members, and recipients (Hupcey, 1998).

As the first component of the above model: social support has numerous definitions in the literature. All definitions, however, possess common characteristics and imply some type of positive interaction or helpful behaviour provided to an individual in need of support (Rook & Dooley, 1985). Examination of the theoretical definition of social support permits us to categorise this concept into four groups: 1) emotional support which includes love, empathy, trust and caring; 2) vital or material support which is provided by a variety of services; 3) information support which includes advice, suggestions needed, and data; and 4) appraisal support such as constructive feedback and affirmation (Heaney & Israel, 2008). Although distinctions have been made between these groups, they need to be studied together in order to understand

their influence on behaviours, as any one group typically provides other types of support.

The second component of the model: social network support, underscores a broader approach than the social support component. Social network support examines more than one social relationship together with changes in one relationship and their possible effect on others. Social network also includes negative interpersonal interactions within social support, as there is existing evidence of such an impact on health behaviours and health outcomes (Heaney & Israel, 2008).

Social support theory can thus be complex and difficult to define and measure, although it provides an in-depth understanding of how social support and social networks impact on people's attitudes, expectations, experiences, beliefs, traditions, habits, and actions taken.

In relation to the current project, social support and social network theory can provide valuable ideas and explanations pertaining to the differences between emergency department users and their support or lack thereof received prior to presentation to the emergency department. The concepts described above can also be used for a review of organisational and community competencies, and thus possess the capability to remedy systemic issues.

4.2.5 Summary of the reviewed models

The models and theories described above contain threads of commonality and are interrelated.

Each brings unique elements and emphasizes factors that can contribute to the understanding of utilisation of health services. The Health Belief Model and theories of illness behaviours accentuate the role of personal beliefs, attitudes, and perceptions, and could be useful in explaining individual behaviours. They do not account, however, for socially and environmentally determined behaviours. Schumann's stages of illness and health utilisation models add the multileveled and multi-faceted factors influencing the decision of patients to use health services. Additionally, Alonzo's and Young's theories underline important components that can be applied to the utilisation of emergency department services. While the theories and models discussed in this section present a broad picture and assist in understanding the utilisation of health services, they are not fully comprehensive and cannot be easily generalised. Social support theories and

models address the influence of social networks on individuals' decision, although they fail to consider adequately the variety inherent in these networks. Additionally, the theories and models do not address adequately an individual's prior experience of illness and its impact on the utilisation of health services. There are also shortfalls in taking into consideration the kind of health care services used by individuals.

In light of the current void together with the specifically tested models for factors that can influence the use of emergency departments, it is proposed that aspects from all the abovementioned models and the factors identified from the literature revision be included, to guide this study with respect to factors influencing demand for utilisation of emergency department services.

4.3 EMERGENCY DEPARTMENT SERVICES USE MODEL

Considering all the above-discussed issues, it is important to develop a conceptual basis for this study and provide a theoretical model of emergency department service use. It should be noted that the principal aim of this phase of the project is to identify and examine the relationship of different factors that influence patients' utilisation of emergency department services. To this end, a hypothesised emergency department service use model, predicated on the amalgamation of previously outlined theories together with models and additional elements specifically related to emergency health service settings drawn from the literature review have been proposed. These are presented in Figure 4.3.

The framework below consists of three components: independent factors, moderating factors, and outcome variables, and displays the hypothesised relationships between its components. The first group of independent factors includes demographic characteristics of the patients such as age, gender, socioeconomic status, ethnicity, marital status, and living arrangements. It has already been established in the literature review section, that patients from various age groups, gender and socio-economic groups, use the emergency health services differently. This data is unique and unchangeable for the individual person, although it can be modified by the multiple factors that influence people's behaviour.

This is presented in the middle component of the model and consists of seven core groups of factors already discussed in previous sections. The following moderating factors are: 1) perceived acuteness which includes the individual’s perception of

seriousness, urgency, together with pain levels of the presenting health problem; 2) general health status which incorporates patients additional health conditions, general health in their own opinion, and the chronic or acute nature of their current medical problem; 3) health beliefs and preferences take into account previous experience and the individuals health beliefs and preferences; 4) perceived costs, benefits, and barriers are determined by individuals and, for example, include financial costs of services, availability, waiting times, convenience, and location and access to emergency department services; 5) cues to action relates to an individual's awareness of options, contact made with someone, or other services prior to seeking care; 6) self-efficacy describes an individual's ability to cope and respond in times of difficulty; and 7) social support concerns a network of family and friends and community support available to patients.

All of these factors are interrelated and therefore may directly (one-sided arrow and continuous line) or indirectly (broken line and two-sided arrow) influence each other.

Finally, the utilisation of emergency department services is a main outcome variable and is measured by the frequency of use, decision-maker, and mode of transport to the emergency department.

As identified in the literature review chapter, the group of frequent users of emergency departments places a significant burden on the health providers. Their potential reasons behind multiple presentations may differ from the group of patients who sparingly access care through emergency departments.

As previously mentioned, an individual makes the decision to seek care of their own accord or somebody else makes it on their behalf, especially in a life-threatening event. Nevertheless, their reasons for accessing the facilities and pathways to the emergency departments differ as well. There are two other groups of users that differ in their utilisation of emergency department services. One of them includes patients that come to the emergency departments by themselves using private or public transport. The second of these groups consists of patients transported by the ambulance services. The potential differences between these groups of emergency department users will be investigated using the proposed framework.

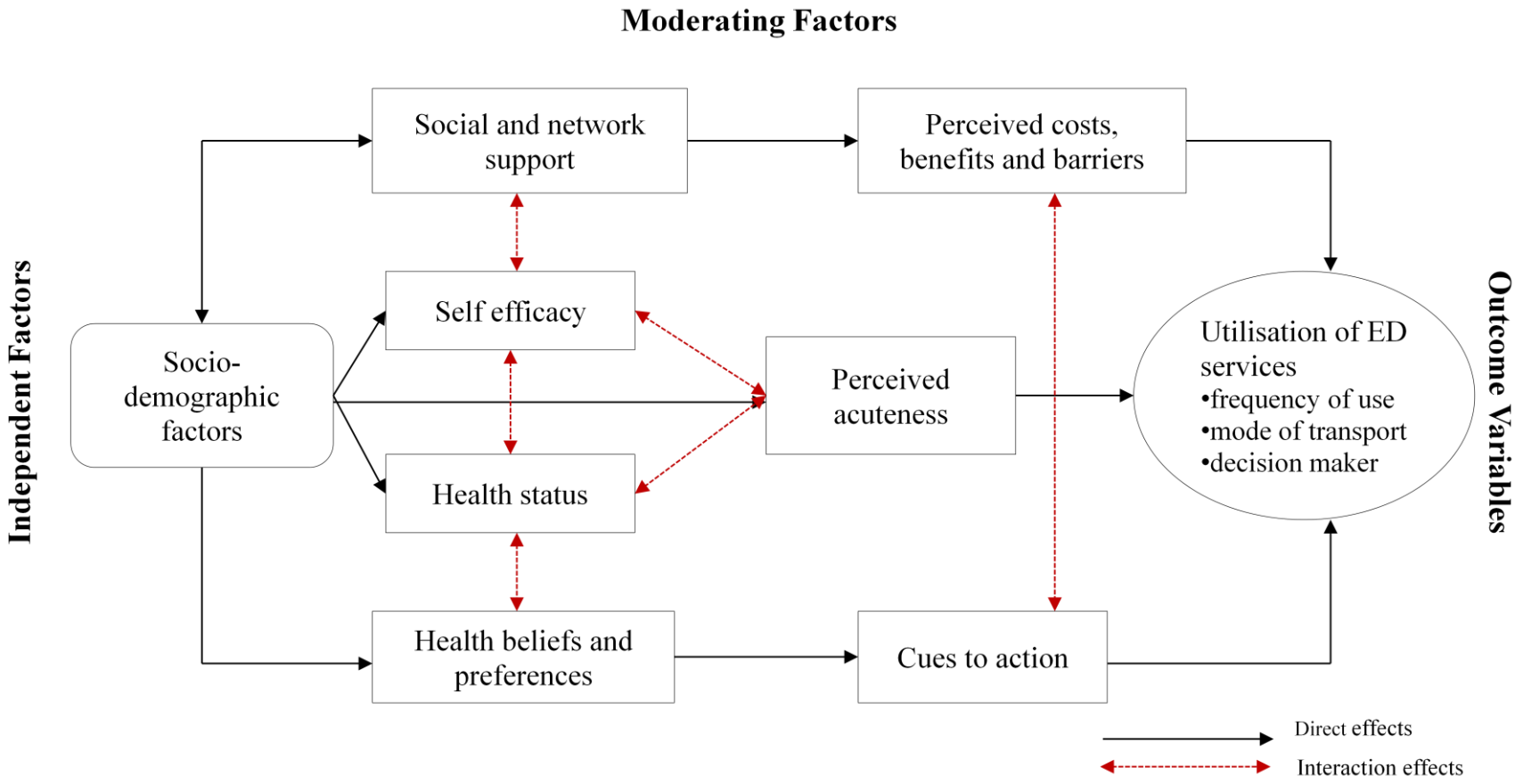


Figure 4.3 The theoretical model of the emergency department services use

4.4 SUMMARY

This chapter provided a comprehensive understanding of theories and models of utilisation of health care services. As there is little or no evidence available to date supporting the effectiveness of recommended or implemented strategies to decrease the demand for emergency department services, this theoretical framework derived from the existing theories and models has been proposed. It aims to investigate the myriad independent and moderating factors affecting the relationship between different groups of emergency department users. Ultimately, understanding which factors are most important in emergency department utilisation can assist in the provision of adequate management of emergency health services. The methods used for this study are presented in the next chapter.

Chapter 5: Methodology

5.1 INTRODUCTION

This chapter outlines the study design, study population, sample selection, and the research instrument used for data collection from the users of emergency departments. It also provides a detailed account of the data collection procedure and describes the study measurements, statistical methods, and analytical plans for the data analyses.

5.2 RESEARCH PROCESS

The research process involved two separate studies. Study one was undertaken to examine the existing data from emergency departments in order to answer research questions as per the aims described in section 1.3.1 as well as to inform Study two in terms of sample size, selection of participating hospitals, and time of data collection. Study two was a cross-sectional study employing a self-completed questionnaire collected from patients in emergency departments in order to answer research questions outlined in section 1.3.2. The detailed methods employed in Study one and Study two are discussed separately below.

5.3 METHODS OF STUDY ONE

The methods presented below for Study one regarding the collection and analysis of data for emergency departments have been published as a part of Emergency Health Services (EHS): Demand and Service Delivery Models. Monograph 2: Queensland EHS Users' Profile (Toloo et al., 2012, pp.15-22).

5.3.1 Data source and management

Emergency department data were obtained from Queensland Health and extracted from a patient administration system known as the Emergency Department Information System (EDIS). EDIS was developed and gradually rolled out from 2001-02. The EDIS data is used for aggregation in the Commonwealth National Non-admitted Patient Emergency Department Care Database (NNAPEDCD). The NNAPEDCD collects episode level data from all peer group A (principal specialist and large hospitals) and B level hospitals (medium and small hospitals) as classified by the Australian Institute of Health and Welfare (AIHW, 2011a). Therefore, not all

hospitals that have emergency departments or use EDIS were included in the collection. Additionally, the National Public Hospital Establishment Database (NPHED) is the database that records the overall number of presentations to Emergency Departments for all public hospitals in Australia without detailed episode level data (AIHW, 2011a: pp. 337-338). Thus, the data in NNAPEDCD only represents a part of the total number of presentations recorded in the NPHED.

Table 5.1 outlines the proportions of NNAPEDCD and NPHED for a period of eight years, with an appreciable increase in coverage in more recent years. "ED presentations (All)" shows the total number of records supplied by QH for the purposes of this analysis. Not all emergency departments, however, had complete data for the full year due to the roll-out or upgrading of the EDIS at different times of the year. To this end, emergency departments for which full year data were not available were excluded, as presented in the row entitled "ED presentations (full year)". The total number of emergency department presentations without detailed episode level data as reported through NPHED (AIHW, [Multi Year]) has been shown in the "ED Occasions of service (NPHED)" line. Accordingly, the 65% full year data coverage in 2003-04 has risen greatly to 75% by 2009-10 and 74% in 2010-11.

Table 5.1 Emergency department data coverage in Queensland: 2003-04 to 2010-11

	2003-04	**2004-05**	**2005-06**	**2006-07**	**2007-08**	**2008-09**	**2009-10**	**2010-11**
ED Presentations (All)[1]	817700	825186	822947	756104	977805	1137964	1184516	1234671
No. of reporting EDs (All)	21	22	22	25	29	31	31	31
ED presentations (full year) [2]	817700	825185	763839	586964	877745	1102733	1184516	1234671
No. of reporting EDs (full year)	21	21	19	13	22	28	31	31
ED Occasions of Service (NPHED)[3]	1248000	1282000	1304000	1382000	1471000	1525000	1578490	1664170
Coverage- ALL[4] (%)	65.5	64.4	63.1	54.7	66.5	74.6	75.0	74.2
Coverage- Full Year[5] (%)	65.5	64.4	58.6	42.5	59.7	72.3	75.0	74.2

Notes

1) Includes all episode level ED data including part year data supplied by QH
2) Includes full year episode level ED data supplied by QH
3) Includes ALL ED occasions of service reported through NPHED (AIHW, [Multi Year])
4) Coverage-ALL = ED Presentations (All) / ED Occasions of Service x 100
5) Coverage-Full Year = ED Presentations (full year) / ED Occasions of Service x 100

A snapshot of the emergency departments' presentations is detailed in Chapter 6 in an effort to show the characteristics of emergency departments' users and how the

emergency departments' resources are consumed as per the research questions for Study one. For this purpose, full-year data from 31 reporting hospitals in 2010-11 was used and presented, thus representing a cross-sectional analysis of emergency departments' activities in Queensland. Additionally, some comparative analysis between full-year data from 21 reporting hospitals in 2003-04 and 2010-11 was undertaken to present trends and changes in emergency departments activities over the eight-year period.

5.3.2 Data quality and accuracy

A comprehensive check was carried out to ensure data quality, completeness, and accuracy as explained below.

- Identifying missing values
  Missing values are inevitable in all datasets and are a function of a multitude of factors such as inapplicability, oversight, lack of response, sensitivity and confidentiality of the information, and lack of interest. It was thus important to check the data for the share of missing values as it can seriously impact the validity of the results if non-respondents are significantly different from respondents. It should also be noted that reasons for missing values can be legitimate as in many instances the information does not apply and consequently the field has to be left blank, such as missing triage category or a diagnosis code for a person who was dead on arrival, or missing treatment or discharge information for a patient who left before the treatment commenced.
- Identifying invalid or out of range values
  In addition to missing values, data can contain values that are not within a reasonable or accepted range. For example:
    i. Age years below zero or above 100 needed to be checked.
    ii. Date and time of arrival for each financial year had to be between 00:00 hours of 1 July and 23:59 hours of 30 June (year after). Similarly, the date and time of triage, treatment and discharge had to be checked and compared with out of range information and logical sequencing. For instance, the date and time of arrival could not be after the date and time of discharge.
    iii. Residential postcodes contained values that are not acceptable postcodes in Australia including names of suburbs, cities, countries, and out of range values.
    iv. Diagnosis codes are assigned according to the International Classification of Diseases (ICD) (WHO, 2011). The codes are grouped under 22 chapters and classified using alpha numeric codes ranging from A00 to Z99 and sub-classifications. The data were checked for codes that were incomplete, inaccurate, or out of the defined range.

Table 5.2 shows a summary of missing and invalid codes for emergency departments variables for 2010-11 year. As is evident, most clinically relevant information has a very small percentage of missing and invalid values.

EDIS data is collected for clinical purposes not research; therefore, some information such as employment status may not be considered important information for a clinician. Also, the accuracy of some information is under question. For instance, 98.3% of the patients spoke "English Only". Even if this information is accurate, it does not reflect the cultural composition of the population and their languages in Queensland.

It is also to be noted that missing data does not necessarily reflect poor quality. In many cases, the information may not be applicable such as when the patient leaves the emergency department before the treatment has started or is dead at arrival. In such circumstances, other information may not be possible to collect and therefore is treated as missing values. All relevant and applicable data is presented in Chapter 6.

Table 5.2 Percentage of missing and invalid data per variable

	Missing		**Invalid**	
Variable	N	%	N	%
Age	2	<.01	0	0.0
Gender	0	0.0	58	<.01
Postcode	387	<.01	18 684	1.5
ICD Code	3 190	0.3	0	0.0
Triage Category	582	<.01	0	0.0
Arrival Method	41 026	3.3	0	0.0
Arrival Date & Time[1]	0	0.0	0	0.0
Triage Date & Time[1]	2 764	0.2	0	0.0
Treatment Date & Time[1]	43 983	3.6	0	0.0
Discharge Date & Time[1]	795	0.1	0	0.0
Departure Status	31 868	2.6	0	0.0
Referral Source	31 472	2.5	0	0.0
Employment Status	627 592	50.8	106 384	8.6
Indigenous Status	1 163	0.1	21 328	1.7
Insurance Status	661	0.1	11 156	0.9
Country of Birth	48	<.01	17 774	1.4
Language	50	<.01	5 778	0.5

1) Reported here only if invalid data could not be imputed.

5.3.3 Data cleaning and compilation

5.3.3.1 Use of full year data

As mentioned in the data coverage section previously, EDIS data were not complete for all hospitals for all years. Therefore, only hospitals for which full-year data were available were included in this research.

5.3.3.2 Treatment of missing or invalid data

a) Replace or impute

Wherever possible, illogical values were imputed and replaced based on other information within the dataset.

a. Date and time data: the datasets included variables of date and time of arrival, triage, treatment, and discharge. For each financial year, arrival dates and times were checked as being within the range of 1 July 00:00 hours to 30 June 23:59 hours (year after). Out of range information was compared with date and time of triage, treatment, and discharge, and corrected accordingly. Similar processes were employed for other variables with date and time information.

b. Postcode: Australian postcodes are 3-4 digit figures between 800-889 and 2000-7470. All postcodes that were out of these ranges, i.e. 0-799, 890-1999, 7471 and above, were excluded from analysis. Where possible, the respective Australian suburbs and localities were checked for their postcodes from Australian Whitepages online directory (www.whitepages.com.au) and replaced accordingly. If a city or country name had been provided, they were coded as Queensland, Other Australia, and Overseas. For geographic socio-economic analysis based on SEIFA (Socio-Economic Indexes for Areas) (Pink, 2008), only cases with valid Australian postcodes were included.

c. ICD code: Invalid codes, i.e. less than 3-character codes were excluded from analysis.

d. If data could not be corrected it was excluded from analysis as user missing values.

b) Exclude from analysis

a. Age: a patient's age was recorded as both date of birth and age in years. For confidentiality reasons, we were provided the age in whole years. The data, however, included negative and extremely high values which were unacceptable as a person's age. Therefore, in consultation with ABS' Census Dictionary (ABS, 2006a: p24) the age range of 0-115 years was adopted and other values were excluded from analysis. This notwithstanding, it should be noted that there is still a chance of data entry error within the accepted range which is not possible to detect.

b. In all other cases, the variables with missing values or invalid data that could not be replaced or imputed were excluded from analysis. These included, for example, values such as "Not Stated", "Unknown", "Inadequately described", "Not elsewhere classified", unrecognisable typographical errors, and so on.

5.3.4 Analysis

Data analyses were performed using PWSA statistical package version 18.0 and Microsoft Office Excel programs were used to manage the data and calculations.

Descriptive statistics were used to show the distribution (raw & percent), trends, patterns, and prevalence in the use of emergency department and ambulance services as well as user characteristics.

The following formulas were used in MS Excel to calculate the total and annual growth rates between two periods:

Total growth rate = *(Last year/First year–1)*100*

Annual growth rate = *(Last year/First year)^(1/1–No. of years between first & last)–100%*

Utilisation rates regarding patients' age and gender were calculated per 1000 persons and figures from the Australian Bureau of Statistics were used for comparisons.

5.3.5 Ethics

The Queensland Health Human Research Ethics Committee (QHREC) also approved the data release and analysis for this stage of the project under protocol number HREC/10/QHC/40 (see Appendix C).

Additional approval was sought and obtained from the QUT Human Research Ethics Committee (QUT HREC) for this stage of the project under protocol number 0800000963 (see Appendix D).

5.4 METHODS OF STUDY TWO

5.4.1 Instruments

A number of steps to develop a satisfactory questionnaire for the cross sectional study used in this research were identified as necessary (Bowling, 2002; Boyce, 2002; Oppenheim, 1992) and were undertaken. The following steps included:

- **Literature review of key issues around demand for emergency department services and associated themes.**

  The literature review around the topic of growing demand identified key issues and were then operationalised into research constructs and transformed into questions understandable to respondents which included e.g. the number of times they used emergency departments in the past, action taken prior to presentation to emergency departments etc.

- **Secondary analysis of EDIS data as explained in Study one.**

  Analysis based on EDIS data identified some trends and characteristics of users which were then included in the study questionnaire and consisted of a variety of socio-demographic questions such as age, gender, marital status, ethnic background, income, education, and employment.

- **Theories and development of the theoretical model for the purpose of the study.**

  The theoretical model for this study was developed as explained in Chapter 4. The components of the model informed the different questions measuring, among others things, beliefs and attitudes towards emergency departments services and perceptions of health status or illness severity.

- **Identification of existing adequate scales.**

  A search for relevant scales was conducted to utilise already existing tools which could measure some of the selected constructs as explain in details later in this chapter.

- **Development of relevant questions and scales, and design of the questionnaires.**

  Additional scales and questions were developed and added to the questionnaire to measure all identified aspects of demand for emergency department services including reasons for use or general opinions about these services as explain in details later in this chapter.

- **Experts review of the draft questionnaire.**

  A group of experts consisting of academics, emergency department clinical practitioners, researchers, and other Ph.D. students reviewed the final draft of the questionnaire. Their general comments and suggestions related to the readability of the questionnaire, formatting and order of questions, and wording which was changed in some instances. Feedback was incorporated into the questionnaire and the pilot was subsequently tested.

- **Pilot-testing the questionnaire.**

  A pilot study was conducted, as described in section 5.4.2, before the questionnaires were finalised.

- **Redesigning the final version of the questionnaire.**

  Upon completion of the above steps, the ***Demand for Emergency Health Services in Queensland Questionnaire*** was finalised. The questionnaire was created in two versions: one for adult patients who would complete the questionnaire themselves and one for children whose parents or guardians would answer the survey questions. The questions were measuring the same concepts in both versions but the wording of questions was adjusted to ensure the appropriateness of the language for both adults and parents. The parents/guardians questionnaire included seven more questions related mainly to a patient's (child) demographics and relationship with the parent/guardian.

  There was a section of questions related to ambulance services which could be omitted if patients did not arrive by ambulance. The final version of the questionnaire was designed by the graphic designer and printed on different coloured papers for two groups of respondents: blue for adult patients and yellow for parents/guardians.

In the final version of the questionnaire most of the questions were closed with the possibility to choose single or multiple answers. There were three types of questions used in the questionnaire:

- single-item questions that measured a variable of interest, e.g. commencement of the current health problem;

- battery questions to measure the same concept by using a series of single items, e.g. perceived health status, by asking a question about other existing conditions and perceived overall health status;

- scales, which involve a series of items about specific concepts and that can be totalled to provide a score with different levels of meaningful degrees.

All questions were numbered and clearly labelled. The questionnaire utilised common convention and provided circles for questions with only one possible answer and squares where multiple responses were possible.

The response format to questions included:

- a dichotomous response (e.g. yes, no; male, female)

- a nominal response (select one or all that apply from a number of provided options and included option "*other, please specify...*")

- an ordinal response (select one from the order of options e.g. excellent, very good, good, fair, poor)

- a ten-point, five-point, four-point, and three-point response format. This format required the writing of a collection of statements to which the respondent would select a response from a continuum e.g. *1* to *10* or *strongly agree, agree, neutral, disagree, strongly disagree*.

- The first question on the questionnaire was open-ended; respondents were asked to describe the problem that made them come to the hospital. This approach was felt to be more effective and inviting for patients to engage in the subsequent questions. More sensitive questions such as those concerning demographics or relating to a respondent's income were placed later in the questionnaire. For the full version of the questionnaires, please see Appendix I for adults and Appendix J for parents/guardians versions.

5.4.2 Pilot study

The pilot study took place in December 2010 in three hospitals in Brisbane. The details regarding the data collection process and collected sample of questionnaires are presented in Table.5.3.

Table.5.3 Pilot study results

	Number of collected surveys	Time at hospital	Survey Type
Redland Hospital	18	9.45am-1.30pm	Adult = 18
Royal Brisbane and Women Hospital	28	10.30am-1.30pm	Adult =27 Parents/Guardians = 1
Mater Children's Hospital	21	1.45pm-4.30pm	Parents/Guardians = 21

There were 67 questionnaires (45 adults and 22 parents/guardians) collected during the nine hours and 30 minutes pilot phase.

The analysis of collected data identified a few questions as being problematic with large numbers of missing, contradictory, or confusing data. As a result the following questions were excluded from the final version of the questionnaire:

- *"How complex would you say the condition is?;*
- *In general, how much of the time are you able to tell if an illness (not just your current condition) is urgent or life-threatening?;*
- *When did you arrive at the hospital?;*
- *Answer this question if you have been seen by a doctor: Given your condition, how long do you think you were able to wait before you saw a doctor?;*
- *Answer this question if you have NOT been seen by a doctor: Given your condition, how long do you think you are able to wait before you see a doctor?;*
- *If someone else decided that you come to the hospital, did you agree with their decision or suggestion at that time?;*
- *Do you think NOW that coming to the hospital was a: very good decision, good decision, neither good nor bad decision, bad decision, very bad decision".*

A number of questions required modification and additional options for responses, or were changed to include the possibility of multiple answers. The wording of questions was also clarified and changed where appropriate. The questionnaire was shortened and all spelling and design errors were corrected.

The scales included in the questionnaire were tested *prima facie* for validity, internal consistency, and reliability of the major components. The Multidimensional Scale of Perceived Social Support initially used returned satisfactory reliability, although based on the content validity the decision was made to replace it by the Duke-UNC Functional Social Support Questionnaire to measure better the construct of social support in the final version of the questionnaire (Broadhead, Gehlbach, DeGruy, & Kaplan, 1988a). The Generalised Self-Efficacy Scale returned a high reliability 0.923 (Mean 21.8 and SD 4.58) and was left unchanged (Schwarzer & Jerusalem, 1995). Similarly, the 10-point metric pain scale (McCaffery & Pasero, 1999), together with questions pertaining to the perception of severity and urgency of the health problem returned satisfactory results. The final version of the questionnaire, however, included two questions related to the perception of pain levels in the past and at the present, similar to the perception of urgency and severity. The scale details, based on the data from collected questionnaires, are discussed in section 5.4.7.1. Face validity was assessed in terms of the presentation and relevance of the questionnaire by the research team and experts in the area. Content validity was also assessed through factor analysis on the set of questions included in the pilot questionnaire to ensure that the content/domain was relevant to the original purpose of this research project.

The data collection process during the pilot study was demanding for data collectors, especially in large and busy emergency departments, and, as a result the shorter shifts in hospitals (maximum six hours) were applied rather than the previously thought eight hours shifts. The pilot study also revealed an average of two questionnaires being collected during one hour. Based on these findings it was estimated that approximately 450 hours of data collection using ten data collectors would be required to achieve the minimum of 900 questionnaires required as per the sample section below.

5.4.3 Sample

For the purpose of this study, a two-level sample was required. The first level determined and selected the number of hospitals where data collection took place and the second level decided on the number of completed questionnaires that needed to be collected.

5.4.3.1 Sample of hospitals

This study utilised the Australian Institute of Health and Welfare classification of emergency departments (2011a). All emergency hospitals across Australia are grouped into four geographical locations: major cities, inner regional, outer regional, and remote. Based on EDIS data for 2008-09 there were 31 reporting emergency departments. Table 5.4 shows the classification of these hospitals and the percentage distribution within the respective category of yearly patient presentations.

Table 5.4 Classification of emergency departments and distribution of presentations

ED Patients in 2008-09	**Hospital Geographic Location (%)**				
	Major Cities	**Inner Regional**	**Outer regional**	**Remote**	**Total**
Mater Adult Public Hospital	5.2				2.8
Mater Children's Public Hospital	6.6				3.6
The Prince Charles Hospital	5.8				3.1
Royal Children's Hospital	4.7				2.5
Princess Alexandra Hospital	7.5				4.0
Ipswich Hospital	7.8				4.2
Redcliffe Hospital	8.3				4.4
QEII Jubilee Hospital	5.8				3.1
Wynnum Hospital	2.7				1.5
Redland Hospital	6.8				3.7
Logan Hospital	9.9				5.3
Gold Coast Hospital	10.4				5.6
Royal Brisbane & Women's Hospital	11.5				6.2
Robina Hospital	7.0				3.8
Caboolture Hospital		12.0			3.6
Beaudesert Hospital		3.8			1.2
Caloundra Hospital		6.3			1.9
Nambour Hospital		10.1			3.1
Bundaberg Hospital		10.5			3.2
Gympie Hospital		6.5			2.0
Hervey Bay Hospital		10.2			3.1
Maryborough Hospital		6.9			2.1
Toowoomba Hospital		12.2			3.7
Gladstone Hospital		7.0			2.1
Rockhampton Base Hospital		11.8			3.6
Yeppoon Hospital		2.5			0.8
Mackay Base Hospital			24.5		3.2
Townsville Hospital			39.6		5.2
Cairns Base Hospital			29.3		3.9
Innisfail Hospital			6.6		0.9
Mount Isa Hospital				100.0	3.1
Total	**610552**	**342747**	**149942**	**34904**	**1138145**

According to the above classification, there were 14 (45.2%) emergency departments in major cities, 12 (38.7%) inner regional emergency departments, 4 (12.9%) outer regional emergency departments, and 1 (3.2%) remote emergency department in QLD in 2008-09. Taking into consideration the ethical clearance requirements, time, budget restrictions, and logistics of the data collection process, it was determined that the data collection would take place in eight emergency departments across Queensland. Two factors were decisive in hospital selection: 1) their geographical location as per AIHW classification; 2) their size and the number of patients presenting during the year. Based on the first factor, geographical location, it was determined that four (50%) of the major cities emergency departments, two (25%) inner regional, and two (25%) outer regional emergency departments were included in the hospital sample. The second factor allowed the selection of particular hospitals based on the number of patients' presentations during the year. The hospitals were then grouped as tertiary hospitals providing services to over 50 000 patients, mid size hospitals seeing between 25 000 and 50 000 patients yearly, and small size hospitals attending less than 25 000 patients a year. Table 5.5 illustrates this categorisation in detail and also provides the location of the hospitals.

Table 5.5 Categorisation of hospital based on number of yearly patients' presentations

	Metro	**Urban and South Queensland**	**Regional and Remote**
> 50, 000	Royal Brisbane and Women's	Redcliffe District Logan Gold Coast Southport	Townsville
25,000- 50,000	Mater Adult Public Mater Children's Prince Charles Royal Children's Princes Alexandra QEII Jubilee	Ipswich Redland Caboolture Robina Nambour General	Rockhampton Bundaberg Toowoomba Mackay Hervey Bay Cairns Mount Isa
<25,000	Wynnum	Beaudesert Caloundra	Gympie Maryborough Gladstone Yeppoon Innisfail

The analysis of data obtained from the 31 reporting hospitals throughout Queensland for the year 2008-09 showed that 29% of presentations were made to emergency departments by patients aged between 0-18 years old. Based on this finding and in order to ensure the representation of young patients in the total number of

questionnaires, it was decided to ensure one children's hospital was deliberately included among the selected group of eight hospitals. Figure 5.1 presents the final sample of selected hospitals for the data collection process based on the sampling process.

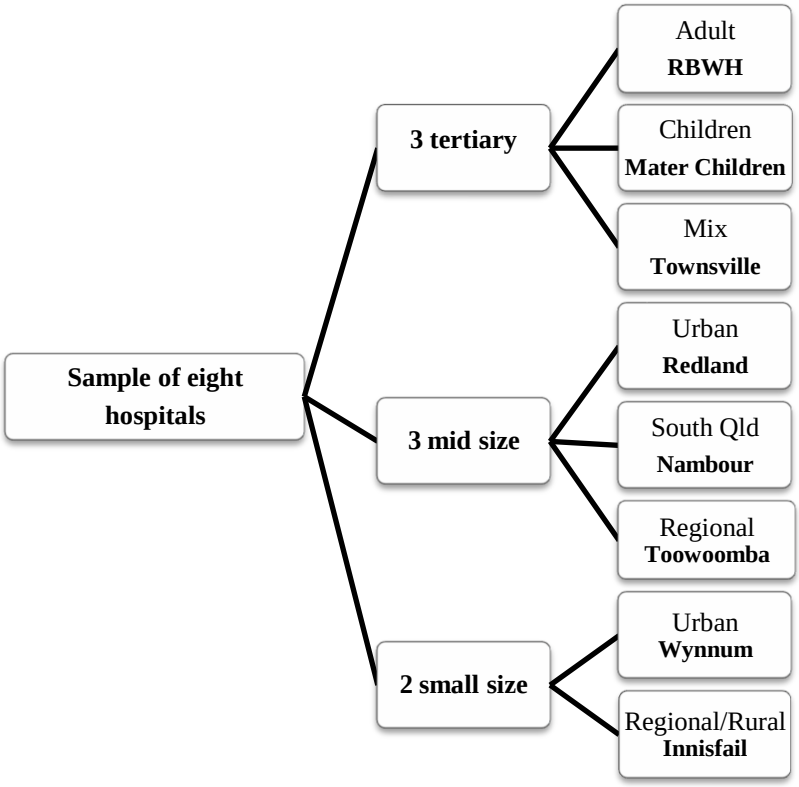


Figure 5.1 Sample of eight hospitals selected for data collection.

5.4.3.2 Calculating the sample size

Regression analysis was conducted to detect changes in the use of emergency department services within regional groupings. The results were inputted into Power Sample software (Dupont & Plummer, 2009) which returned a sample size of 3987 with a 99% sampling power. Due to resource and time restrictions, however, the power was reduced to 80% with an alpha value of 0.05. A sample size of 859 was calculated with an Intraclass Correlation Coefficient of 0.061 and design effect factor of 4.13. This number was increased to a minimum 900 respondents in order to account for possible incomplete questionnaires (Toloo et al., 2013).

The sample size of required 900 questionnaires was divided among each of the participating emergency departments using the distribution of patients' presentations for 2009-10 year from EDIS as a guide. Table 5.6 presents the method of division of

the required sample of questionnaires among the eight selected emergency departments. Fifty four percent of the questionnaires were estimated to be collected from three major-city emergency departments, 24% from the inner regional emergency departments, and 22% from small remote emergency departments.

Table 5.6 Comparison between the distribution of patients in 2009-10 and in the required sample

	Total number and % of presenting patients for 8 hospitals for 2009-10	**Required sample of 900 Questionnaiers**
Major cities	177 301 (54%)	486 (54%)
Inner regional	77 153 (24%)	216 (24%)
Remote	71795 (22%)	198 (22%)
Total	**329 249**	**900**

A further division was made between all participating hospitals, and separate quotas were calculated for each of the respective emergency departments. In an effort to ensure adequate responses from under-age patients, 20% of the 900 questionnaires were assigned to the Mater Children's hospital, as it remained uncertain how many paediatric questionnaires would be collected from general emergency departments. A total of 720 adults and 180 parents/guardians questionnaires were estimated to be collected from the emergency departments as shown in Table 5.7.

Table 5.7 Number of required questionnaires from participating emergency departments

Hospital	**Number required**	
	Adult	**Parent/guardian**
Mater Children's Hospital		180
Royal Brisbane and Women's Hospital	185	
Wynnum Hospital	45	
Redland Hospital	110	
Townsville Hospital	155	
Toowoomba Hospital	110	
Innisfail Hospital	25	
Nambour Hospital	90	
Total	**720**	**180**

5.4.4 Participants

Participants in this research project included all patients attending emergency departments at selected hospitals during the data collection period who consented to take part in the project and completed the patient questionnaire.

There were three groups of participants:

1) Patients 18 years old and over who could consent for themselves.

2) Patients 15 to 17 years old who were accompanied by their parents or legal guardians. Both signed the consent to participate.

3) Parents or guardians of patients below 15 years old, as children did not have a reasonable understanding of the project or the ability to participate in the research.

All patients in waiting room areas and inside emergency departments during the data collection period were approached and asked for consent to take part in the research project and complete the questionnaire. The aim and objectives of the study were briefly explained to participating patients by data collectors and they were also provided with a Patients Information Sheet (Appendix A). The questionnaires were given to patients for self completion but in some instances restricted assistance with reading and writing was provided to patients who were not able to complete the questionnaire themselves for a number of reasons but still wished to participate. A group of patients were provided with a prepaid envelope permitting them to take the questionnaire home and send it to the research group upon completion.

This research project aimed to identify patients' reasons for attending emergency departments. Therefore all patients present at the nominated emergency departments during the data collection period were regarded as suitable for the research project. Some groups of patients, however, had to be excluded from the study if they were:

- children not accompanied by a parent or legal guardian at the time of presentation to emergency department;
- adults with cognitive impairment or other conditions which did not allow them to consent for themselves;
- patients who were identified by the clinical staff at emergency departments as being under the influence of drugs or alcohol, or who were isolated or quarantined for any other safety reason;
- patients who did not understand English and had no interpreters present.

5.4.5 Data collection

5.4.5.1 Preparation phase

In the preparation phase there were a number of steps and activities undertaken before the data collection commenced. These included:

- budgeting for all costs associated with data collection such as the design and printing of questionnaires, remuneration for data collectors, and costs associated with travel to and accommodation in proximity to the nominated hospitals;
- recruitment of data collectors and organisation of a training workshop;
- rostering for data collection in agreement with the directors of the respective emergency departments or their contact people;
- development, design, and preparation of all required documents such as consent forms, information sheets for patients, tally sheets, and information packs for data collectors.

In total, 2000 copies of the surveys were printed: adults and parents/guardians. Additional documentation such as the patient's information sheet and consent forms were also printed on colour coded papers to assist data collectors in the distribution of the appropriate documents. All of the data collectors were equipped with the research packs for each of the hospitals and shifts including all required materials. The data collectors also had a number of pre-paid envelopes for patients who would volunteer to complete the questionnaire at home and send it back to the research team. The data collection was conducted by four members of the research team together with a group of nine trained data collectors, all of whom had experience and qualifications in relevant disciplines such as social science, psychology, public health and nursing. The main tasks of the interviewers were to: approach patients; explain the research project; gain their consent; screen them for selecting the right questionnaire; assist with the completion of the forms if needed by reading the questions for respondents; collect the completed questionnaires; and fill in tally sheets that would assist the team to calculate information such as response rates. Prior to the collection of data, all data collectors attended the half-day training session where the objectives of the research project, all the requirements, and the logistics and processes of data collection were explained and rehearsed.

5.4.5.2 Data collection phase

Data collection commenced on 29 March, 2011 and concluded on 24 May, 2011. Interviewers were rostered and deployed to the hospitals and data collection took place between 8am and 10pm on different days of the week/weekend to capture a variety of patients. Due to the university's Occupational Health and Safety rules, the interviewers had to be deployed in pairs and no data collection was permitted to be performed overnight. There were, however, a number of patients who arrived at emergency departments during the night who were captured during the early morning shifts. There were a total of 24 days of data collection which amounted to 232 hours of data collection. One hundred thirty six (14.9%) of the questionnaires were collected in March, 570 (62.6%) in April, and 205 (22.5%) in May 2011.

There were 911 questionnaires collected in total for the purpose of this study including 687 (75.4%) from adults and 224 (24.6%) from parents/guardians. These were collected from a total of eight emergency departments as presented in Table 5.8. A comparison between the distribution of adult and parent/guardian questionnaires according to levels of specialisation of emergency departments indicates fairly equal proportions. To this end, 123 parent/guardian questionnaires were collected from tertiary emergency departments and 101 from not tertiary emergency departments. In the case of adult questionnaires, 335 were collected from tertiary emergency departments versus 352 from non-tertiary emergency departments. Approximately, two thirds of parent/guardian and adult questionnaires came from urban emergency departments (147 versus 436 respectively), and one third from regional and remote emergency departments (77 versus 251 respectively).

Table 5.8 Number of questionnaires collected from selected emergency departments

	Number of collected questionnaires		**% in total**
	adults	parents/guardians	
Mater Children's Hospital		81	8.9
Wynnum Hospital	38	15	5.8
Redland Hospital	106	24	14.3
Nambour Hospital	83	21	11.4
Toowoomba Hospital	96	35	14.4
Townsville Hospital	126	36	17.8
Royal Brisbane and Women's Hospital	209	6	23.6
Innisfail Hospital	29	6	3.8
Total (N)	**687**	**224**	**911**

Out of the total number of collected questionnaires, 900 were completed in emergency departments and returned by the data collectors, and further 11 questionnaires were posted to the research team utilising the pre-paid envelopes.

5.4.6 Data management

Preparation for the data analysis commenced after all questionnaires were collected and the hard copies were returned. The following steps were undertaken in this process.

5.4.6.1 Data coding

The process of coding, by which data from the questionnaires were converted into variables and categories using a range of numbers, was undertaken so that the data could be entered into computer programs for analysis. Exhaustive codes and coding protocols were developed whereby a unique and mutually exclusive code number was created for each category. Information being coded could only be assigned to one category. Each survey was given a number which was then entered to the database.

5.4.6.2 Missing data

The data was also verified for missing values. The pattern of missing data was checked by testing differences between cases with missing data and cases with no missing data using Chi-square statistics. Where no significant differences were found, an indication that the missing data is completely random (an alpha level of .05), no substitution methods were used to replace the missing values (Tabachnick & Fidell, 2012). Due to the sufficiently large size of the sample, the missing data were excluded from the analysis using pair-wise exclusion as suggested by some scholars (Coakes & Ong, 2010; Pallant). The percentage of missing data for each variable is reported in section 7.4. The mean substitution method, however, was employed to deal with the missing data for each scale using one of the single imputation methods. This method involves replacing a missing score with an overall sample average prior to the analysis (Kline, 2005). This approach is simple and conservative and, in the absence of all other information, the mean is the best estimate of the value of a variable (Kline, 2005; Tabachnick & Fidell, 2012).

5.4.6.3 Data entry

Data entry was conducted by a research assistant using Microsoft Office Excel 2007. The data from each survey were entered into the dataset with a unique ID number.

Subsequently, the data were imported into the Statistical Package for the Social Science (SPSS) system version 18 (IBM Software, New York, USA).

The completed data set was stored in a restricted access folder location on the Queensland University of Technology's secure server. The folder was only accessible by the research team members at Queensland University of Technology, who were authorised to access the data. Paper surveys were stored in a securely locked Queensland University of Technology cabinet in accordance with Queensland Government's University Sector Retention and Disposal Schedule (Queensland Disposal Authority Number, 2009).

5.4.6.4 Data verification

In an effort to verify data and eliminate any entry mistakes, 10% of the total sample of collected data were randomly selected and re-entered by another member of the research team. There was less than 2% discrepancy between the two samples of data entry, and all differences were checked and agreement was reached on the interpretation of the data entry.

5.4.6.5 Data cleaning

Upon completion of the data entry and in an effort further to eliminate errors that possibly transpired during the coding and data entry stages, a data cleaning standard procedure was introduced. Two types of checks were used to ensure appropriate data cleaning. The first check examined frequency distributions of all variables and looked for outliers and wild codes. The second step involved consistency checks which focused on internal data consistency, for example, checking the questions for impossible combinations, mutually exclusive answer options, and inconsistent values and meanings. The uncertain records were rechecked with the original questionnaire and corrected where possible or removed from the data set.

5.4.7 Study measurements

All measures were presented as an array of questions within a standard questionnaire. There was no previously developed or used questionnaire that could have been adapted for the current research project. This notwithstanding, the questionnaires utilised, as far as possible, existing standard measures of the key constructs, or questions from prior studies where applicable. Thus, where existing measures or data were not available new items were developed for the purpose of this project. Table 5.9 summarises all the measures used in the questionnaires.

Table 5.9 Measurements for the research

Variables	Source of measurements	Question number
Independent variables		
Demographics: age, gender, income, marital status, education	Devised for the research	20, 21, 36, 39, 42
Ethnicity: country of birth, Indigenous status, language proficiency	Devised for the research	24, 26, 37
Other characteristics: living arrangements, years living in Australia, employment status, number of years in Australian education	Devised for the research	22, 25, 41,40
Moderating variables		
Social and network support: social support scale,	The Duke-UNC Functional Social Support Questionnaire	34
Place where problem started,	Devised for the research	3
Accompanied by others	Devised for the research	4
Contact and suggestion made by someone prior coming	Devised for the research	15, 16
General health status: perceived overall health status, other health conditions, commence of the current medical problem	Devised for the research	11, 12, 2
Health belief and preference: Reasons for coming to EDs and general statements	Devised for the research	18, 19
Self efficacy	The Generalised self-efficacy scale by Jerusalem and Schwarzer	35
Perceived severity: seriousness, urgency of condition and pain before and at ED,	Devised for the research and 10-point metric pain scale adapted for the research	5,6,7,8,9,10
Perceived priority category	Devised for the research	14
Perceived costs and benefits: Insurance status, reasons for coming to EDs and general statements	Devised for the research	23, 18, 19
Cues to action: Reasons for coming to EDs and general statements	Devised for the research	18, 19
Outcome variable		
Frequency of use	Devised for the research	13
Mode of transport	Devised for the research	27
Decision maker	Devised for the research	17

The section below describes the formation and application of scales used in further analysis. The detailed analysis of independent, moderating (other than scales), and three outcome variables are presented in the results chapter in section 7.4.

5.4.7.1 Scales

The scales used for the purpose of this study were:

- chosen and adapted into questionnaire format from existing and validated studies;
- extracted and developed based on Principal Component Analysis (PCA) items from question 18;
- based on theoretical framework scales from questions related to urgency, seriousness, and levels of pain (items number 5,6,7,8,9,10). These were combined and redeveloped into new scales.

Face and content validity of the scales were evaluated during the pilot study as described previously in section 5.4.2. Internal consistency was used to assess the reliability of each scale, which was calculated prior to any subsequent analysis. Cronbach's Alpha coefficient above 0.7 was used as a method of assessing internal reliability and acceptability of the scale (Nunnally & Bernstein, 1994). A score slightly lower than 0.7 indicated marginally unacceptable levels of internal reliability. Accordingly, such a scale should be used with caution. This notwithstanding, and as argued by some scholars, construct values below 0.7 in psychological tests can be expected because of the diversity of the construct being measured (Kline, 1999). Scales with a Cronbach Alpha coefficient markedly lower than 0.7 indicated an unacceptable level of internal reliability and were not included in further analysis. The summary of results of the internal reliability test for each scale, including the number of items and cases are presented in Table 5.10 followed by a detailed description of each scale and its components.

Table 5.10 Cronbach's Alpha reliability coefficients for the scales

Scales	Cronbach's Alpha	Number of items	Number of cases
1. Social support	0.922	8	802
2. Self efficacy	0.901	7	812
3. Best services at EDs	0.729	6	824
4. Condition related presentation	0.698[1]	4	794
5. Perception of condition in the past	0.742	3	873
6. Perception of condition at present	0.808	3	853

[1] Score slightly lower than 0.7 - the scale should be used with caution

5.4.7.1.1 The Duke-UNC Functional Social Support Questionnaire

This social support scale was adapted for the purpose of this study and included the following eight items to measure the strength of the person's social support network:

1. *I have people who care what happens to me.*
2. *I get love and affection.*
3. *I get chances to talk to someone about problems at work or with my housework.*
4. *I get chances to talk to someone I trust about my personal or family problems.*
5. *I get chances to talk about money matters.*
6. *I get invitations to go out and do things with other people.*
7. *I get useful advice about important things in life.*
8. *I get help when I am sick in bed.*

The collected responses to each item on the scale were assigned a number ranging from 1 to 5 including responses such as *"strongly agree, agree, neutral, disagree, strongly disagree"*.

Responses to these eight items were summed to range from 8 to 40 to provide for a signal measure, with a higher score reflecting a greater value. The scale has a very high internal consistency, with a reported Cronbach Alfa of 0.922 (Mean 35.53 and SD 6.37). The internal consistency ranged from 0.50 to 0.85 in the original study on the Duke-UNC Functional Social Support Questionnaire (Broadhead, Gehlbach, DeGruy, & Kaplan, 1988b) and was confirmed by a study in Spain (Saameno, Sanchez, del Castillo, & Lardelli, 1996).

5.4.7.1.2 The Generalised Self-Efficacy Scale

The self-efficacy scale was selected from the published scales to assess the general sense of perceived self-efficacy and to predict the ability to cope with daily hassles as well as adaptability after experiencing all kinds of stressful life events. The original 10-item scale was reduced to 7 items (3 redundant items removed) which included:

1. *I can always manage to solve difficult problems if I try hard enough.*
2. *If someone opposes me, I can find the means and ways to get what I want.*
3. *It is easy for me to stick to my aims and accomplish my goals.*
4. *I am confident that I could deal efficiently with unexpected events.*
5. *I can solve most problems if I invest the necessary effort.*
6. *If I am in trouble, I can usually think of a solution.*
7. *I can usually handle whatever comes my way.*

The responses of each item on the scale had a number assigned ranging from 1 to 4 including responses such as *"not true at all, hardly true, moderately true, exactly true"* as in the original study. Responses to these seven items were summed to range from 7 to 28 to provide a single measure, with a higher score reflecting greater value. The scale has a very high internal consistency, with a Cronbach Alfa of 0.901 (Mean 21.57 and SD 4.43). In comparison, the scale reliability sampled from 25 nations ranged from 0.75 to 0.91, with the majority in the high .80s (Scholz, Gutiérrez-Doña, Sud, & Schwarzer, 2002).

The third scale, the 10-point metric pain scale, was used in the questionnaire to measure patients' pain level related to presenting condition and was combined with levels of perceived seriousness and urgency of their condition. The details are presented further in section 5.4.7.1.4 and 5.4.7.1.5.

Additionally, Principal Component Analysis (PCA) was conducted on the 11 items with orthogonal rotation (Varimax) to extract the maximum amount of variance from the component loadings across each of the items of question 18. Patients were asked, in this question, to indicate to what extent they consider each of the mentioned reasons for coming to the emergency department for their health problem. The Kaiser-Meyer-Olkin measure verified the sampling adequacy for the analysis, KMO = .77 which is well above the acceptable limit of .5 (Field, 2013). Bartlett's test for sphericity x^2 (28) = 168,401, $p < .001$, indicated that correlation between items was sufficiently large for PCA. An initial analysis was run to obtain eigenvalues for each component in the data. Three components had eigenvalues over Kaiser's criterion of 1 and in combination explained 54% of the variance. Table 5.11 shows the factor loadings after rotation. The items that cluster on the first component suggest that emergency services are convenient, free and professional and, items on component 2 related to perception of patients' condition. There was only one item on component 3 which was used separately in further analysis. The first factor was then named *Best services at emergency departments* and the second was called *Condition related presentations.*

Table 5.11 Summary of exploratory factor analysis result for question number 18.

	Varimax Rotation		
	Component 1	Component 2	Component 3
Reasons for coming to Emergency Departments			
e) Hospital services are free.	.75		
d) It's convenient to have all facilities in one place in the hospital.	.67		
a) Hospital is open all the time.	.67		
i) The hospital is close to where I am.	.57		
g) Hospital doctors and nurses are better specialised.	.49		
h) GPs charge an extra fee.	.60		
f) My condition was too severe to go elsewhere.		.80	
k) Other options were not as suitable as the hospital for my problem.		.69	
j) Because the hospital provides better care for my condition.		.62	
b) I needed immediate (urgent) care.		.69	
c) No other health services or GP were available at the time.			.93
% of variance explained	**23%**	**21%**	**10%**

5.4.7.1.3 Best services at emergency departments

Each item on the scale had a number assigned ranging from 1 to 3 with possible responses worded: "*yes, considered it to a great extent, considered it to some extent, did not consider it*". This scale included the following items:

1. *Hospital services are free.*
2. *It's convenient to have all facilities in one place in the hospital.*
3. *Hospital is open all the times.*
4. *The hospital is close to where I am.*
5. *Hospital doctors and nurses are better specialised.*
6. *GPs charge an extra fee.*

Responses to these six items were summed to range from 6 to 18 to give a signal measure, with a higher score reflecting greater value. The scale has high internal consistency, with Cronbach Alfa reported of 0.729 (Mean 11.1 and SD 3.26) and explained 23 per cent of the variance.

5.4.7.1.4 Condition related presentations

The second scale derived from PCA on question 18 included the following items which had a number assigned ranging from 1 to 3 with possible responses worded: "*yes, considered it to a great extent, considered it to some extent, did not consider it*":

1. *My condition was too severe to go elsewhere.*
2. *Other options were not as suitable as the hospital for my problem.*
3. *Because the hospital provides better care for my condition.*
4. *I needed immediate (urgent) care.*

Responses to these four items were summed to range from 4 to 12 to give a signal measure, with a higher score reflecting greater value. The scale has moderate internal consistency, with Cronbach Alfa reported of 0.698 (Mean 8.89 and SD 2.36) and explained 21 per cent of the variance. It was decided to use this scale but with caution.

Further, 10-point scales measuring patients' perspective on the severity, urgency, and levels of pain in the past and at the time of completing the questionnaire (question 5 to 10 on the questionnaire), were recalculated and two scales were formed: *perception of condition in the past* and *present perception of condition.*

Figure 5.2 illustrates the distribution of patients' responses in relation to their perception of seriousness, urgency, and pain levels of the presenting condition before the two scales were formed.

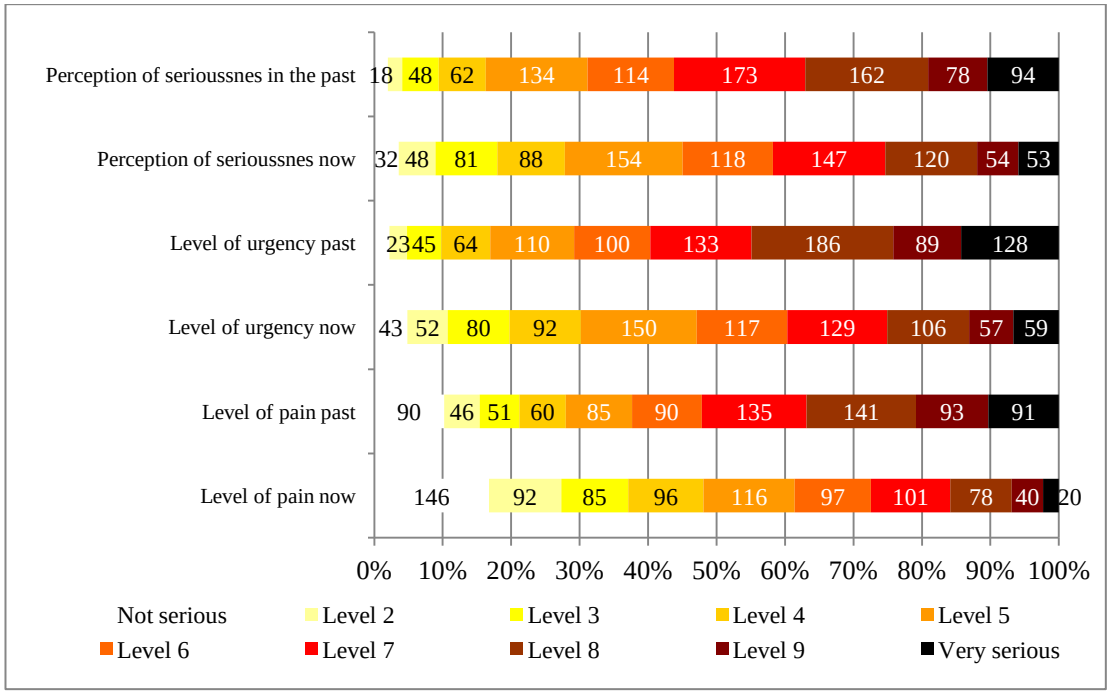


Figure 5.2 Patients' perception of seriousness, urgency, and pain levels

5.4.7.1.5 Perception of condition in the past

The respondents were asked to indicate their level of seriousness, urgency, and pain with regard to their condition using numbers from 1 (not serious, not urgent, no pain

at all) to 10 (very serious, urgent, pain as bad as it gets). This scale included the following items:

1. *How serious did you think the condition was at the time you decided to come to the hospital?*
2. *How urgent did you think the condition was at the time you decided to come to the hospital?*
3. *How much pain did you feel at the time you decided to come to the hospital?*

Responses to these three items were summed to range from 3 to 30 to give a single measure, with a higher score reflecting a greater value. The scale has good internal consistency, with a Cronbach Alpha of 0.724 (Mean 19.57 and SD 5.89).

5.4.7.1.6 Perception of condition at present

Similar to the above, this scale included the following three items with possible answers measured on a 1 to 10 scale:

1. *How serious do you think the condition is now?*
2. *How urgent do you think the condition is now?*
3. *How much pain do you feel now?*

Responses to these three items were summed to range from 3 to 30 to provide a single measure, with a higher score reflecting a greater value. The scale has good internal consistency, with a Cronbach Alpha of 0.808 (Mean 16.19 and SD 6.21).

5.4.8 Analysis

5.4.8.1 Statistical programs

Statistical Package for the Social Sciences (SPSS) version 19 (IBM Centre) was used for all data analyses. The following components were included: survey response rate, socio-demographic characteristics of patients and participants, bivariate analyses, and multivariate analysis.

5.4.8.2 Analytical steps

A three-step analysis approach was applied to examine the relationships and impact between the independent and moderating variables and the three outcome variables as per the theoretical model for this study described in Chapter 4. Figure 5.3 illustrates the analyses undertaken and applied to three groups of variables, followed by a detailed description of all components.

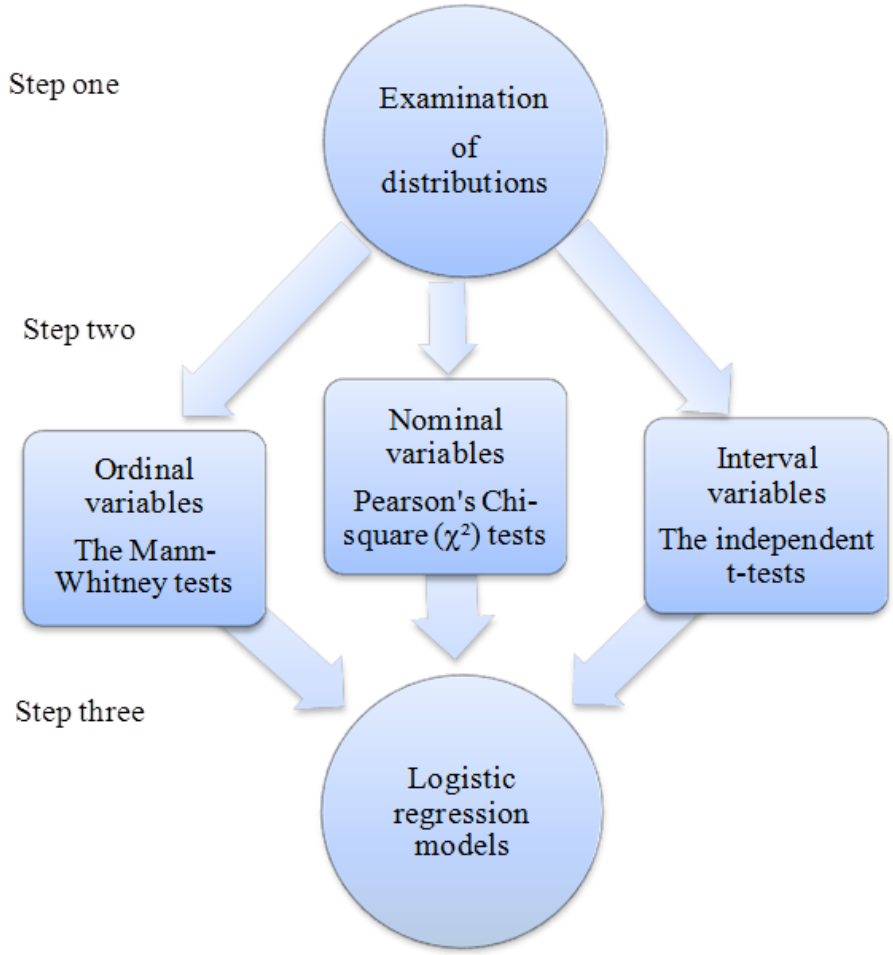


Figure 5.3 Steps in data analysis

Step one included descriptive analyses performed for all variables. The categorical variables were summarised using percentage and counts. The continues variables were summarised and presented using mean and standard deviation. Histograms were used to illustrate distribution of data. Additionally, this step demonstrates which of the variables underwent some transformation and how this occurred for the purpose of further statistical analyses. The results of these tests are discussed in section 7.4.

Step two involved the application of different statistical tests for three different groups of variables in an effort to measure relationships between them and the outcome variable including:

1) The independent t-tests were performed to determine whether there is a statistically significant difference between the means in two unrelated groups. The following assumptions (Field, 2013) were checked before the test was applied:

- Normality assumption - it is required that the dependent variable is normally distributed approximately within each group. The histograms were checked and the Kolmogorov-Smirnov tests were performed to assess normal distribution.
- Homogeneity of variance - the distribution of the dependent variable for one of the groups being compared must have the same variance as the distribution for the other groups being compared. The assumption of homogeneity of variance was tested using Levene's Test of Equality of Variances.
- All observations were independent of each other, and
- The dependent variable was measured on an interval scale.

2) Mann-Whitney tests were performed to test the relationships between the variables for which data were ordinal. The assumptions pertaining to independent variables and independence of observations were met.
3) Pearson's Chi-square (χ^2) tests were used for examination of the relationship between two nominal variables. The assumptions for the independence of data and expected frequencies (no expected values were below 5 for 2x2 contingency tables and no more than 20% of the expected counts were less than 5 for associations between three or more categorical variables) were met (Field, 2013). Cramer's V correlation coefficient and Pearson's correlation coefficient were used do examine the strength of relationship between two variables where a relationship was found to be significant. Values close to 1 or -1 indicated a nearly perfect relationship, while values close to 0 indicated a trivial or no relationship. Values close to 0.1 indicated a week relationship, values 0.3 medium/moderate, and 0.5 strong relationship between the two variables (Corder & Foreman, 2009). In the case of 2 × 2 tables, Cramer's V correlation coefficient was equal to Pearson's correlation coefficient (Elliott & Woodward, 2007).

The results of these tests are discussed in section 8.1.

In step three, a logistic regression model was used to examine the final relationship between the predicting variables and the utilisation of emergency department

services, since all three outcome variables were dichotomous. All assumptions were tested before the modelling analyses were performed. Variables, only those which in step one had a significant relationship with dependent variables, were tested in the final logistic regression model to determine their independent impact on outcome variables. Logistic regression was performed using the stepwise method with a forward, likelihood ratio entry. Significance tests, parameters, and odds ratios were calculated for the predictor variable to determine the degree of influence each independent/moderating variable had on the outcome variable. The final models are presented in Chapter 8.

5.4.9 Ethics

The Prince Charles Human Research Ethics Committee granted multi-site ethical approval (Approval No. HREC/10/QPCH/98, see Appendix E) for seven Queensland Health sites including: Royal Brisbane and Women's Hospital, Nambour Hospital, Wynnum Hospital, Innisfail Hospital, Redland Hospital, Townsville Hospital, and Toowoomba Hospital. The Mater Hospital Human Research Ethics Committee approved the conduct of research at the Mater Children's Emergency Department (Approval No. 1621AC, see Appendix F). The approval for this stage of research was also sought and obtained from QUT Human Research Ethics Committee (Approval No. 1000001131, see Appendix G). Additionally, the research liaison officer at each site was contacted and Site Specific Approvals were sought and obtained before data collection commenced.

Chapter 6: Results Study one: Characteristics of emergency department users

6.1 INTRODUCTION

Chapter 6 presents the results from Study one and examines the first PhD objective which tries to identify characteristics of users and factors contributing to the increased demand for emergency department services, as presented in Chapter 1. The results of data analysis have been published as a part of Emergency Health Services (EHS): Demand and Service Delivery Models. Monograph 2: Queensland EHS Users' Profile (Toloo et al., 2012, pp.32-52).

This chapter begins with an investigation of various characteristics related to emergency department visits and the medical classification of diseases. Finally, it undertakes an analysis of the demographic profile of patients with comparisons to the population data.

6.2 CHARACTERISTICS OF EMERGENCY DEPARTMENT VISITS

6.2.1 Geographical locations

As shown in Table 6.1, over 1.2 million patients attended emergency departments in 2010-11 throughout Queensland. The National Hospital Morbidity Database for 2009–10 (AIHW, 2011b) categorises public hospitals according to their peer grouping and remoteness into various categories including:

A1 Principal referral
A2 Specialist women's and children's
B1 Large Major cities
B2 Large regional and remote
C1 Medium (group 1)
C2 Medium (group 2)
D1 Small regional acute
D2 Small non-acute
D3 Small remote acute

Two-third of the patients attended Principal referral and Specialist emergency departments and nearly 16% went to Large emergency departments in major cities or regional and remote areas of the state.

Table 6.1 Number of hospitals per category and number of presenting patients 2010-11

	No. of hospitals	No. of patients treated	%
Principal referral & Specialist (A1-A2)	17	828162	67.1
Large major-Regional-remote (B1-B2)	5	195439	15.8
Medium (C1-C2)	5	116090	9.4
Small regional acute-Non acute (D1-D2)	2	34807	2.8
Not peer grouped (Robina, Capricorn)	2	60173	4.9
Total	**31**	**1234671**	**100.0**

6.2.2 Triage category

Figure 6.1 shows the distribution of patients by triage category. Eleven percent of patients in 2010-11 were assigned category 1 or 2 on Australasian Triage Scale (ACEM, 2000). The highest group of presenting patients were classified as category 4 (41.3%) followed closely by patients in category 3 (39.5%).

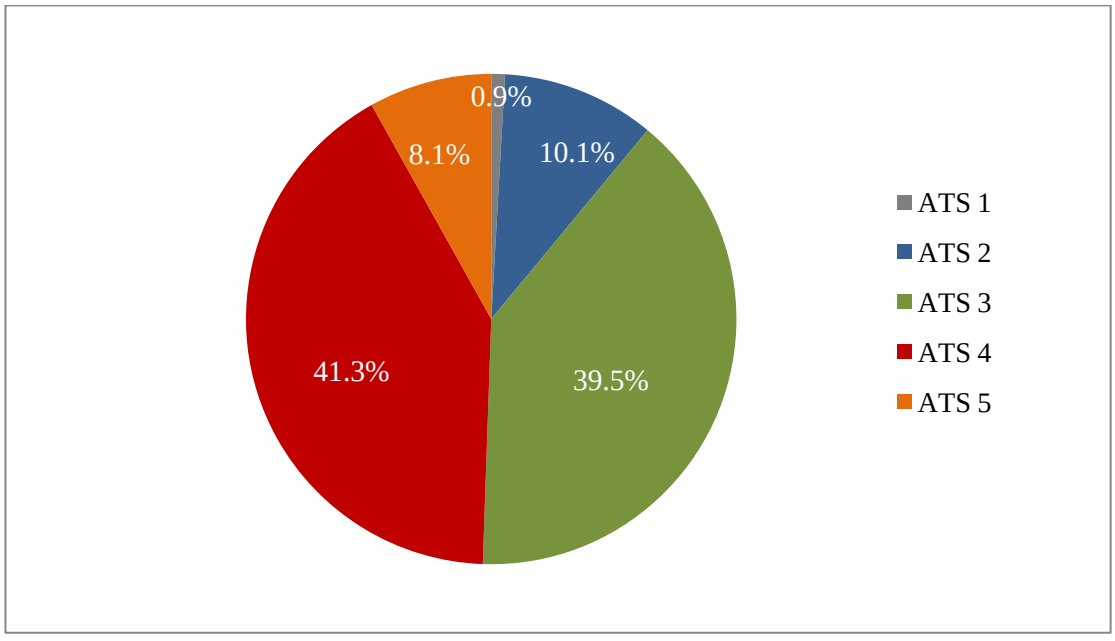


Figure 6.1 Percentage distribution of patients per triage category (ATS): 2010-11

6.2.3 Arrival time variations

The time of arrival of patients is presented in Figure 6.2. The highest percentage of patients' arrivals was observed during daylight hours from a maximum rate of arrival around 10am (6.5%) which then continued at approximately the same rate until 7pm (5.7%) and slowly declined during late night/earlier morning hours until 6am (1.4%).

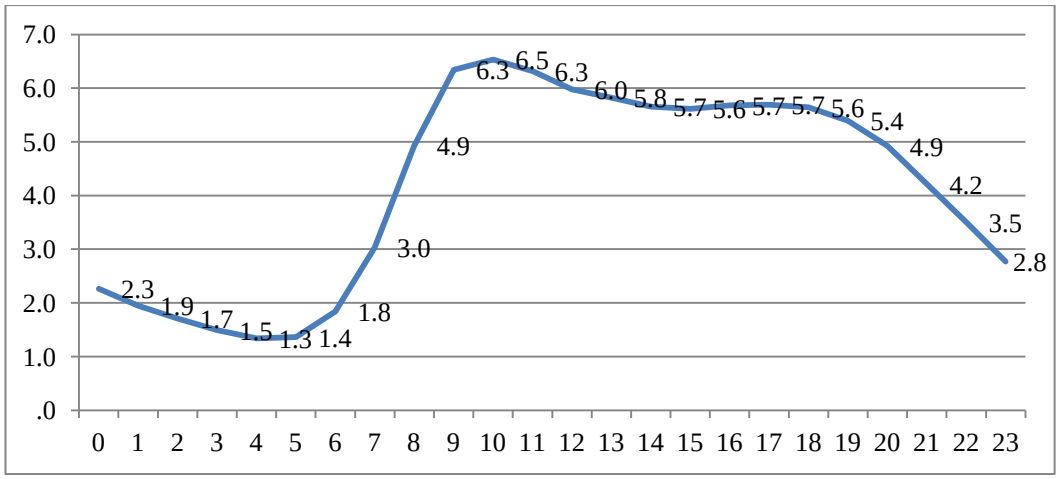


Figure 6.2 Time of patients' arrival to emergency departments as percentage of total in 2010-11

Table 6.2 is a composite figure, which identifies the arrival time in six-hourly periods for patients in each of the triage categories. The highest presentation for triage categories 1-3 patients occurred during late night hours (midnight till 5:59am) where presentations for patients in categories 4 and 5 took place during the morning hours (6-11:59am).

Table 6.2 Arrival time by triage category 2010-11

		Triage category					
Time of the day		1	2	3	4	5	**Total** (N)
Midnight-5:59	%	1.4	13.0	45.6	36.7	3.4	**124 963**
6:00-11:59	%	0.7	8.9	34.5	43.2	12.7	**357 930**
12:00-17:59	%	0.8	10.0	39.2	41.4	8.6	**425 462**
18:00-23:59	%	1.0	10.7	43.1	41.0	4.3	**326 589**

Figure 6.3 shows the percentage of arrivals by day of the week. The highest number of arrivals occurred from Saturday to Monday (14.4%, 15.45 and 15.2% respectively) with lower and similar percentage of attendance during the rest of the week (below 14%).

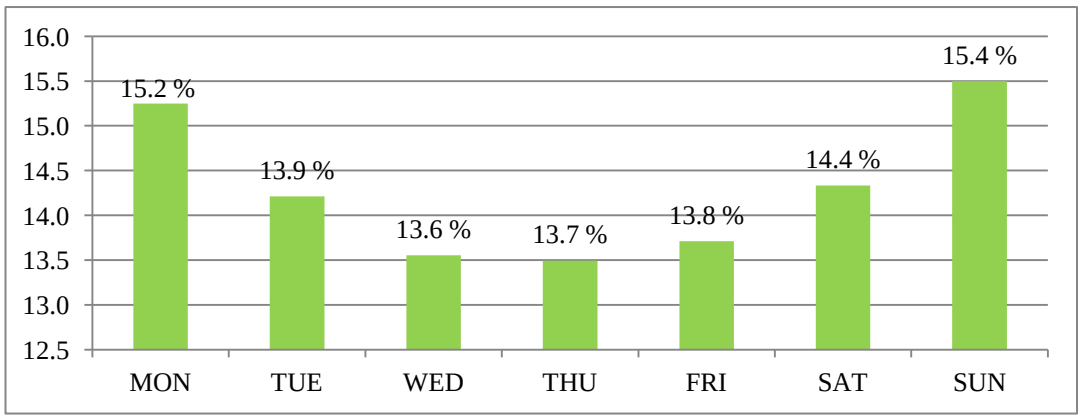


Figure 6.3 Arrival by day of the week 2010-11

Table 6.3 demonstrates whether patients attending on different days were of different acuity levels. There were no clear and significant variances between patients' presentations during weekdays and weekends based on their assigned triage category. The only observable difference is for patients category 4 presenting more often on Sundays and Saturdays (44.4% and 42.4% respectively) compared to other days of the week hovering around 40%.

Table 6.3 Day of the week by triage category 2010-11

		Triage Category					Total
		1	**2**	**3**	**4**	**5**	**(N)**
Monday	%	0.8	10.1	38.6	41.5	9.0	**187 356**
Tuesday	%	0.8	10.3	39.6	40.6	8.7	**171 594**
Wednesday	%	0.9	10.5	40.1	40.2	8.4	**168 001**
Thursday	%	0.8	10.6	40.4	40.1	8.1	**169 110**
Friday	%	0.9	10.5	40.4	39.9	8.4	**170 850**
Saturday	%	1.0	9.9	39.4	42.4	7.3	**177 647**
Sunday	%	0.9	9.3	38.4	44.4	7.1	**190 386**

6.2.4 Referral source

The source of referral of patients is outlined in Table 6.4. The vast majority of patients (91.2%) came directly to emergency departments bypassing any other health services. Just above 4% were referred by General Practitioners, 1.6% from other hospitals and remaining 3% from all other health and public services.

Table 6.4 Presentations by referral source 2010-11

Source of referral	**N**	**%**
Self family friends	1 096 751	91.2
General practitioner	500 81	4.2
Other hospital	197 68	1.6
Police	8 312	0.7
Nursing home	8 256	0.7
Outpatients clinic	2 218	0.2
Community services	1 933	0.2
Other not listed	1 571	0.1
Consultant	476	<0.1
Welfare organisation	259	<0.1
Total	**1 203 199**	**100.0**

Table 6.5 compares the sources of referral according to triage category assigned. The highest number of patients referred by General Practitioners were category 3 and 4 (50.8% and 35.6% respectively), and the highest number of patients who come directly to emergency departments were assigned category 4 (42.2%) followed by category 3 (38.9%).

Table 6.5 Presentations by source of referral and triage category 2010-11

		Triage Category					Total
Referral source		1	2	3	4	5	**(N)**
Emergency Department	%	0.2	1.2	7.4	41.3	50.0	**13 570**
Other hospital	%	3.4	15.5	54.7	23.1	3.2	**19 756**
General Practitioner	%	0.1	9.9	50.8	35.6	3.6	**50 062**
Self family friend	%	0.9	10.1	38.9	42.2	8.0	**1 096 223**
Others	%	2.1	18.6	48.8	21.9	8.6	**23 006**

6.2.5 Discharge diagnosis

The clinical reasons for patients' presentations are captured by International Classification of Diseases (ICD) codes as detailed in Table 6.6. The highest number of presentations was related to Injury and poisoning (28%), followed by group of factors influencing health status (13.6%) and abnormal clinical and laboratory findings (12.4%).

Table 6.6 Presentations per ICD Code 2010-11

ICD Code	**N**	**%**
I-Infectious and parasitic	63484	5.2
II-Neoplasms	5567	.5
III-Blood	4775	.4
IV- Endocrine, nutritional	9386	.8
V- Mental and behavioural disorders	43733	3.6
VI- Nervous system	19774	1.6
II- Eye and adnexa	9660	.8
VIII- Ear and mastoid process	20769	1.7
IX-Circulatory system	50578	4.1
X- Respiratory system	107092	8.7
XI- Digestive system	66661	5.4
XII- Skin and subcutaneous tissue	48613	3.9
XIII- Musculoskeletal system and connective tissue	28344	2.3
XIV- Genitourinary system	53398	4.3
XV- Pregnancy childbirth and puerperium	15138	1.2
XVI- Conditions originating in perinatal period	1363	.1
XVII- Congenital malformations deformations etc	403	<.1
XVIII- Abnormal clinical and laboratory findings nec	152420	12.4
XIX- Injury & poisoning etc	344906	28.0
XX- External causes of morbidity and mortality	17176	1.4
XXI- Factors influencing health status etc	167986	13.6
Total	**1 231226**	**100.0**

Table 6.7 compares ICD diagnostic codes by time of arrival and indicates that the highest proportion of patients presented to emergency departments during midday hours (12-6pm) regardless of the nature of their condition, apart from diseases classified under Chapter VIII (Ear and mastoid process) and Chapter XIII (Musculoskeletal system and connective tissues). Patients diagnosed with these types of conditions presented more often during morning hours (6am-12pm) than any other times.

Table 6.7 Distribution of presentations by diagnosis code per time of the day 2010-11

		Arrival Time				Total
ICD code		0-5:59	6-11:59	12-17:59	18-23:59	(N)
I-Infectious & parasitic	%	11.6	28.5	31.2	28.7	**63 484**
II-Neoplasms	%	7.1	34.4	40.3	18.2	**5 567**
III-Blood	%	5.0	32.2	41.0	21.8	**4 775**
IV- Endocrine, nutritional	%	9.1	28.7	38.6	23.6	**9 386**
V- Mental & behavioural disorders	%	14.4	21.2	35.5	29.0	**43 733**
VI- Nervous system	%	9.9	29.5	35.5	25.1	**19 774**
VII- Eye & adnexa	%	6.2	36.0	35.1	22.7	**9 660**
VIII- Ear & mastoid process	%	13.0	33.3	28.6	25.1	**20 769**
IX-Circulatory system	%	11.6	30.5	35.4	22.5	**50 578**
X- Respiratory system	%	14.5	27.9	29.9	27.7	**107 092**
XI- Digestive system	%	14.4	28.3	31.4	26.0	**66 661**
XII- Skin & subcutaneous tissue	%	5.3	34.0	37.4	23.2	**48 613**
XIII- Musculoskeletal system & connective tissue	%	7.8	40.1	33.6	18.5	**28 344**
XIV- Genitourinary system	%	11.5	28.9	33.3	26.3	**53 398**
XV- Pregnancy childbirth & puerperium	%	8.2	33.7	35.9	22.2	**15 138**
XVI- Conditions originating in perinatal period	%	6.3	18.0	43.6	32.1	**1 363**
XVII- Congenital malformations deformations etc	%	6.5	27.0	45.2	21.3	**403**
XVIII- Abnormal clinical & laboratory findings nec	%	11.5	28.0	33.9	26.7	**152 420**
XIX- Injury & poisoning etc	%	7.4	28.1	38.0	26.5	**344 906**
XX- External causes of morbidity and mortality	%	11.7	19.1	35.2	34.0	**17 176**
XXI- Factors influencing health status etc	%	9.3	30.8	32.0	27.9	**167 986**

Table 6.8 presents the ICD classification codes according to presentations occurring during different days of the week. Patients came to emergency departments with multiple complaints and there was not much variation among the conditions and the day of presentation. The proportion of presenting patients varied from the lowest 8.7% to the highest 18.6%.

Table 6.8 ICD Code per day of the week 2010-11

		Arrival Day							Total
ICD code		MON	TUE	WED	THU	FRI	SAT	SUN	(N)
I-Infectious & parasitic	%	15.1	14.1	13.2	13.6	12.9	14.3	16.7	**63 484**
II-Neoplasms	%	16.1	15.0	15.5	15.3	15.8	11.0	11.4	**5 567**
III-Blood	%	14.4	15.7	14.8	16.0	18.6	11.2	9.3	**4 775**
IV- Endocrine, nutritional	%	15.1	14.0	14.7	15.2	14.4	13.0	13.6	**9 386**
V- Mental & behavioural disorders	%	14.3	13.8	14.1	13.9	14.5	15.1	14.4	**43 733**
VI- Nervous system	%	15.4	14.4	14.6	14.7	14.4	13.2	13.3	**19 774**
VII- Eye & adnexa	%	14.8	12.5	12.3	12.7	14.2	16.2	17.4	**9 660**
VIII- Ear & mastoid process	%	15.3	13.6	12.8	12.8	13.0	15.0	17.5	**20 769**
IX-Circulatory system	%	15.5	14.8	14.7	15.1	14.9	12.6	12.5	**50 578**
X- Respiratory system	%	15.3	14.0	13.6	13.4	13.1	13.9	16.7	**107 092**
XI- Digestive system	%	15.2	14.2	13.9	14.2	13.9	13.7	15.0	**66 661**
XII- Skin & subcutaneous tissue	%	15.7	14.2	13.5	13.5	13.7	13.9	15.5	**48 613**
XIII- Musculoskeletal system & connective tissue	%	16.4	14.7	13.9	14.1	13.7	12.6	14.5	**28 344**
XIV- Genitourinary system	%	15.1	14.4	14.0	14.3	14.1	13.5	14.6	**53 398**
XV- Pregnancy childbirth & puerperium	%	15.3	14.7	14.0	14.8	15.4	12.7	13.1	**15 138**
XVI- Conditions originating in perinatal period	%	14.6	14.2	12.2	13.9	17.9	13.9	13.3	**1 363**

XVII- Congenital malformations deformations etc	%	15.4	17.1	14.4	18.4	16.1	8.7	9.9	**403**
XVIII- Abnormal clinical & laboratory findings nec	%	15.4	14.6	14.3	14.6	14.2	13.2	13.6	**152 420**
XIX- Injury & poisoning etc	%	14.3	12.9	12.9	13.1	13.6	16.4	16.9	**344 906**
XX- External causes of morbidity and mortality	%	14.0	13.9	13.3	13.7	14.6	14.7	15.8	**17 176**
XXI- Factors influencing health status etc	%	16.5	14.3	13.8	13.3	14.0	13.5	14.6	**167 986**

The diagnosis codes and triage category of patients arriving to emergency departments is presented in Table 6.9, which indicates that the highest proportion of patients presented to emergency departments were assigned triage category 3 or 4 across the majority of ICD codes. Only patients with conditions classified under Chapter IX (Circulatory system) were assigned more often triage category 2 than other patients.

Table 6.9 ICD Code per triage category 2010-11

		Triage Category					**Total**
ICD Code		1	2	3	4	5	(N)
I-Infectious & parasitic	%	0.2	3.5	46.4	46.6	3.4	**63 484**
II-Neoplasms	%	0.8	10.3	60.3	24.2	4.5	**5 567**
III-Blood	%	0.3	15.3	61.8	18.7	3.9	**4 775**
IV- Endocrine, nutritional	%	1.3	16.2	61.4	19.5	1.6	**9 386**
V- Mental & behavioural disorders	%	0.9	11.9	50.0	30.3	7.0	**43 729**
VI- Nervous system	%	2.1	10.1	63.6	22.4	1.8	**19 773**
VII- Eye & adnexa	%	0.0	5.8	35.2	52.1	6.8	**9 657**
VIII- Ear & mastoid process	%	0.0	1.4	27.5	62.0	9.0	**20 767**
IX-Circulatory system	%	4.0	43.0	40.8	11.0	1.2	**50 575**
X- Respiratory system	%	0.9	12.4	50.5	33.4	2.8	**107 089**
XI- Digestive system	%	0.2	7.3	56.4	33.3	2.7	**66 661**
XII- Skin & subcutaneous tissue	%	0.0	1.4	23.3	62.3	13.0	**48 608**
XIII- Musculoskeletal system & connective tissue	%	0.0	4.7	30.8	56.5	8.0	**28 340**
XIV- Genitourinary system	%	0.1	5.8	56.0	35.6	2.6	**53 396**
XV- Pregnancy childbirth & puerperium	%	0.4	4.8	54.6	37.2	2.9	**15 136**
XVI- Conditions originating in perinatal period	%	0.3	18.1	60.7	18.2	2.7	**1 362**
XVII- Congenital malformations deformations etc	%	1.5	17.6	55.1	22.3	3.5	**403**
XVIII- Abnormal clinical & laboratory findings nec	%	0.7	23.4	50.2	23.5	2.2	**152 410**
XIX- Injury & poisoning etc	%	1.4	7.0	32.2	53.2	6.2	**344 879**
XX- External causes of morbidity and mortality	%	0.6	17.3	41.7	33.5	6.9	**17 174**
XXI- Factors influencing health status etc	%	0.2	1.9	21.1	47.6	29.3	**167 681**

6.2.6 Departure status

Table 6.10 details the departure status of patients. Over two-third of patients were discharged after completion of treatment and 18.5% were admitted to different hospital wards. Notably, around 7% of patients either did not wait to be seen by a doctor or left emergency departments without finishing treatment.

Table 6.10 Patients departure status 2010-11

Departure status	**N**	**%**
Admitted	22 1938	18.5
ED service event completed-discharged	820 506	68.2
Transfer to another hospital	25 588	2.1
Did not wait	66 071	5.5
Left after treatment commenced	19 813	1.6
Died in ED	766	0.1
Dead on arrival	115	<0.1
Admitted to DEM	13 744	1.1
Admit to OBS ward	34 143	2.8
Completion by Admin	119	<0.1
Total	**1 202 803**	**100.0**

Table 6.11 compares the departure status for each of the triage categories. The majority of category 1 and 2 patients were admitted to the hospital (73.7% and 56.8% respectively), and high percentages of categories 3, 4 and 5 patients were discharged after receiving treatment (61.3%, 79.3% and 85.1% respectively). Interestingly, 1.5% of category 1 patients did not wait to complete their treatment.

Table 6.11 Patients discharge status per triage category 2010-11

	Triage category (%)					**Total**
Departure status	1	2	3	4	5	(%)
Admitted[1]	73.7	56.8	33.8	10.8	3.6	24.6
Discharged[2]	20.1	41.1	61.3	79.3	85.1	68.2
Did not wait[3]	1.5	2.0	4.8	9.9	11.3	7.1
Died[4]	4.7	0.1	0.0	0.0	0.1	0.1
Total (N)	**10 685**	**122 810**	**475 091**	**494938**	**98611**	**1 202 135**

1) Includes: Admitted (excl. ED bed), Transfer to another hospital, Admitted to DEM, Admit to OBS ward
2) ED service event completed-discharged
3) Includes: Did not wait, Left after treatment commenced
4) Includes: Died in ED, Dead on arrival (no treatment provided in ED)

Patients' departure status within the ICD codes is presented in Table 6.12. Patients with conditions related to blood (75%), neoplasms (73.9%), circulatory system (68.6%), endocrine (62.2%) and congenital malformations (56.7%) were far more likely to be admitted than other patients. Patients with other conditions were more likely to be discharged after their treatment at the emergency department. Interestingly, a high number of patients (42.7%), whose conditions were classified under Chapter XXI (Factors influencing health status) did not wait for treatment or left before treatment was finished. This same group of patients was also assigned a high proportion of triage categories 4 and 5 (47.6% and 29.3% respectively) as shown in Table 6.9. Further investigation showed that three-quarter of diagnoses within this ICD code related to patients encountering health services for specific procedures (43.9%), for follow-up examinations after treatment for conditions other

than malignant neoplasms (17.3%), and for examinations and observations for reasons other than suspected diseases and conditions (13.8%).

Table 6.12 Patients' departure status per ICD code 2010-11

	Departure status %				Total
IDC code	Admitted	Discharged[2]	DNW[3]	Died[4]	**N**
I-Infectious & parasitic	15.6	83.7	0.7	<0.1	**62 061**
II-Neoplasms	73.9	25.2	0.4	0.6	**5 405**
III-Blood	75.0	24.3	0.6	0.1	**4 640**
IV- Endocrine, nutritional	62.2	36.1	1.6	0.1	**9 081**
V- Mental & behavioural disorders	27.8	68.7	3.5	<0.1	**43229**
VI- Nervous system	36.1	62.4	1.5	<0.1	**19 098**
VII- Eye & adnexa	7.5	92.0	0.5	0.0	**9 327**
VIII- Ear & mastoid process	7.2	92.5	0.4	0.0	**20 326**
IX-Circulatory system	68.6	29.8	0.8	0.8	**49 298**
X- Respiratory system	32.0	67.3	0.6	0.1	**105 146**
XI- Digestive system	42.3	56.7	1.0	<0.1	**64 656**
XII- Skin & subcutaneous tissue	28.2	71.2	0.6	<0.1	**47 463**
XIII- Musculoskeletal system & connective tissue	16.4	83.0	0.6	0.0	**26 754**
XIV- Genitourinary system	35.2	64.1	0.7	<0.1	**51 341**
XV- Pregnancy childbirth & puerperium	26.3	72.7	1.0	0.0	**13 741**
XVI- Conditions originating in perinatal period	33.2	66.0	0.8	0.0	**1 350**
XVII- Congenital malformations deformations etc	56.7	42.8	0.5	0.0	**388**
XVIII- Abnormal clinical & laboratory findings nec	36.2	61.1	2.5	0.2	**146 252**
XIX- Injury & poisoning etc	15.6	83.5	0.9	0.0	**336 897**
XX- External causes of morbidity and mortality	25.5	72.0	2.5	0.0	**170 019**
XXI- Factors influencing health status etc	4.0	53.3	42.7	<0.1	**166 331**

1) Includes: Admitted (excl. ED bed), Transfer to another hospital, Admitted to DEM, Admit to OBS ward
2) ED service event completed-discharged
3) Includes: Did not wait, Left after treatment commenced
4) Includes: Died in ED, Dead on arrival (no treatment provided in ED)

Departure status also varied by source of referral as demonstrated in Table 6.13. Eighty percent of the patients referred by other hospitals were consequently admitted to wards. Over a third of GP referrals and almost 23% of patients who come to emergency departments by themselves were admitted. Seventy percent of self referred patients were discharged after being seen in emergency departments, and 7.5% of self referred patients did not wait for completion of treatment in 2010-11.

Table 6.13 Distribution of discharge status by source of referral: 2010-11

		Discharge status				Total
Referral source		Admitted[1]	Discharged[2]	DNW[3]	Died[4]	N
Emergency Department	%	8.4	88.4	3.2	0.0	**13 567**
Other hospital	%	80.4	18.5	0.9	0.1	**19 729**
General Practitioner	%	35.7	59.5	4.8	0.0	**49 569**
Self family friends	%	22.8	69.7	7.5	0.1	**1 096 143**
Others	%	45.2	50.8	3.3	0.6	**22 903**

1) Includes: Admitted (excl. ED bed), Transfer to another hospital, Admitted to DEM, Admit to OBS ward
2) ED service event completed-discharged
3) Includes: Did not wait, Left after treatment commenced
4) Includes: Died in ED, Dead on arrival (no treatment provided in ED)

6.2.7 Length of stay

Patients' progress through emergency departments is measured by various time sequences such as waiting to be seen and assessed and total time in emergency departments. Using the data we calculated two measures: 1) time between triage and treatment and 2) time between arrival and discharge. In both cases, the data set included values with extremes (e.g. minus 113 years and plus 19 days) therefore filters were used to calculate mean and median for these variables. For the first measure, time between triage and treatment, only data with range between 0 minutes to 24 hours were used and consequently 88,991 cases (7.2% of all cases) were excluded from the analysis. For the second measure, time between arrival and discharge, data with range 0 minutes to 48 hours were used which excluded 1,407 cases (0.11% of all cases) from analysis.

The ACEM has determined the Maximum Waiting Time to Treatment and Performance Indicator Threshold for each triage category as presented in Table 6.14. "The indicator threshold represents the percentage of patients assigned Triage Code 1 through to 5 who commence medical assessment and treatment within the relevant waiting time from their time of arrival" (ACEM, 2000).

Table 6.14 Maximum waiting time and performance indicator threshold for triage categories

Triage Category	Maximum waiting time to treatment	Performance Indicator Threshold
1	Immediate	100%
2	10 minutes	80%
3	30 minutes	75%
4	60 minutes	70%
5	120 minutes	70%

Table 6.15 presents the average length of time to treatment for each of the triage categories. The median for triage to treatment time for all patients is 32 minutes and the median for each of the triage categories indicates that half of the patients were seen within the recommended time, as per the Australasian Triage Scale in emergency departments guidelines detailing the maximum times patients should wait for assessment and treatment.

Table 6.15 Waiting time from triage to treatment (in minutes) 2010-11*

Triage category	Mean	Quartile 1	Median	Quartile 3	SD[1]	Total (N)
1	1.17	1	0	0	8.82	7 773
2	12.1	3	7	13	20.5	116 530
3	52.6	14	30	69	61.5	477 568
4	70.5	19	47	98	73.1	487 288
5	58.2	13	35	80	68.9	82 743
Total	**56.1**	**12**	**32**	**76**	**66.7**	**1 171 902**

*Figures in this table are more likely to have been impacted by data quality in calculating the waiting time.
[1]Standard deviation

Table 6.16 presents the average length of stay in emergency department for each of the triage categories. The median length of stay from arrival to departure is overall 174 minutes, but varies from 76 minutes for category 5 to 298 minutes for category 2 patients.

Table 6.16 Length of stay from arrival to discharge (in minutes) 2010-11

Triage category	Mean[1]	Quartile 1	Median	Quartile 2	SD[2]	Total (N)
1	358.5	159	275	454	307.7	1 0711
2	379.7	178	298	482	302.6	125 074
3	321.0	130	233	401	296.8	486 974
4	191.5	74	132	229	210.7	509 837
5	110.3	39	76	138	129.7	100 094
Total	**256.6**	**91**	**174**	**319**	**267.2**	**1 232 690**

[1] Figures in this column are more likely to have been affected by data errors as explained before.
[2] Standard deviation

6.2.8 Arrival method

Patients arrive at hospital through a variety of means dependent on the severity of their illness and a range of other factors. Table 6.17 outlines patients' arrival method where 72.6% patients arrived to emergency departments by themselves using private or public transport and further 27.3% patients were transported by ambulance services including road and air services.

Table 6.17 Presentations by method of arrival 2010-11

Method	N	%
Ambulance- Road	319 956	26.8
Ambulance- Helicopter	1 945	0.2
Ambulance- Fixed Wing	3 689	0.3
Community Services	305	<0.1
Police or Prison Vehicle	120	<0.1
Walked in- Public or Private Transport	866 061	72.6
Other	1 569	0.1
Total	**1 193 645**	**100.0**

Subsequent tables compare the two major arrival methods (ambulance and self arrivals) for triage category, ICD code groups and departure status. Table 6.18 shows

that majority of high acuity patients were transported by ambulance services (88% of category 1 and 54% of category 2) but noticeably approximately 12% and 46% of patients in these high acuity triage categories came to emergency departments by their own or private transport. Patients in lower acuity categories were more likely to walk in or use own transport.

Table 6.18 Triage category by arrival mode: 2010-11

	Triage Category (%)				
	1	2	3	4	5
Ambulance (Road & Air)	88.0	54.3	36.7	15.1	4.2
Self (walk-in, public or private transport)	12.0	45.7	63.3	84.9	95.8
Total (N)	**10 551**	**120 538**	**469 882**	**492 580**	**97 528**

Table 6.19 on the other hand shows that among patients using ambulance services the largest group were assigned triage category 3 (53%) and the largest group of patients arriving by themselves using either private or public transport were assigned triage category 4 (48%).

Table 6.19 Arrival mode by triage category: 2010-11

	Triage Category (%)					**Total**
	1	2	3	4	5	(N)
Ambulance (Road & Air)	2.9	20.1	53.1	22.8	1.2	**325 509**
Self (walk-in, public or private transport)	0.1	6.4	34.3	48.4	10.8	**865 570**

As presented in Table 6.20, over a quarter of ambulance arrivals were for patients with injury and poisoning problems, followed by abnormal clinical and laboratory findings (17.9%). Problems of circulatory system and mental and behavioural conditions constituted around 8% of ambulance transports. A similar trend is observed for self arrivals.

Table 6.20 Arrival method by principal ICD code 2010-11

ICD Code		**Ambulance**	**Self**
I-Infectious and parasitic	%	2.8	6.1
II-Neoplasms	%	0.8	0.3
III-Blood	%	0.5	0.4
IV- Endocrine, nutritional	%	1.4	0.5
V- Mental and behavioural disorders	%	5.7	2.3
VI- Nervous system	%	2.7	1.2
VII- Eye and adnexa	%	0.1	1.0
VIII- Ear and mastoid process	%	0.7	2.1
IX-Circulatory system	%	8.6	2.4
X- Respiratory system	%	8.0	9.2
XI- Digestive system	%	5.8	5.3
XII- Skin and subcutaneous tissue	%	1.4	5.0
XIII- Musculoskeletal system and connective tissue	%	2.0	2.3
XIV- Genitourinary system	%	4.2	4.4

XV- Pregnancy childbirth and puerperium	%	0.5	1.4
XVI- Conditions originating in perinatal period	%	<0.1	0.1
XVII- Congenital malformations deformations etc	%	<0.1	<0.1
XVIII- Abnormal clinical and laboratory findings nec	%	17.9	10.1
XIX- Injury & poisoning etc	%	27.6	28.5
XX- External causes of morbidity and mortality	%	1.6	1.2
XXI- Factors influencing health status etc	%	7.5	16.2
Total (N)		**324 549**	**863 717**

Table 6.21 shows that only 3 groups of patients, diagnosed with conditions related to circulatory, neoplasms and endocrine/nutritional conditions were more often transported to emergency departments by ambulance. Patients with all other classifications of conditions in majority came by themselves.

Table 6.21 ICD code per arrival method by 2010-11

ICD Code		**Ambulance**	**Self**	**Total** (N)
I-Infectious and parasitic	%	14.5	85.5	**62 006**
II-Neoplasms	%	51.4	48.6	**5 363**
III-Blood	%	33.7	66.3	**4 629**
IV- Endocrine, nutritional	%	51.6	48.4	**9 025**
V- Mental and behavioural disorders	%	48.5	51.5	**37 978**
VI- Nervous system	%	45.6	54.4	**19 037**
VII- Eye and adnexa	%	5.1	94.9	**9 300**
VIII- Ear and mastoid process	%	11.8	88.2	**20 304**
IX-Circulatory system	%	57.0	43.0	**49 100**
X- Respiratory system	%	24.7	75.3	**105 022**
XI- Digestive system	%	29.2	70.8	**64 527**
XII- Skin and subcutaneous tissue	%	9.5	90.5	**47 315**
XIII- Musculoskeletal system and connective tissue	%	24.0	76.0	**26 681**
XIV- Genitourinary system	%	26.4	73.6	**51 246**
XV- Pregnancy childbirth and puerperium	%	12.8	87.2	**13 736**
XVI- Conditions originating in perinatal period	%	7.7	92.3	**1 349**
XVII- Congenital malformations deformations etc	%	21.3	78.7	**385**
XVIII- Abnormal clinical and laboratory findings nec	%	39.9	60.1	**145 656**
XIX- Injury & poisoning etc	%	26.7	73.3	**335 456**
XX- External causes of morbidity and mortality	%	34.4	65.6	**15 427**
XXI- Factors influencing health status etc	%	14.8	85.2	**164 724**

A higher percentage of patients brought by ambulance services were admitted to hospital than patients presenting by themselves (46.9% compare to 16%) as demonstrated in Table 6.22. Interestingly 5.3% who come to emergency departments by ambulance did not wait for completion of treatment and left emergency departments.

Table 6.22 Arrival method by departure status 2010-11

		Admitted[1]	**Discharged**[2]	**DNW**[3]	**Died**[4]	**Total** (N)
Ambulance	%	46.9	47.6	5.3	0.2	**325 403**
Self	%	16.0	76.1	7.9	<0.1	**865 585**

1) Includes: Admitted (excl. ED bed), Transfer to another hospital, Admitted to DEM, Admit to OBS ward
2) ED service event completed-discharged
3) Includes: Did not wait, Left after treatment commenced
4) Includes: Died in ED, Dead on arrival (no treatment provided in ED)

6.3 CHARACTERISTICS OF EMERGENCY DEPARTMENTS USERS

6.3.1 Gender and age

On average, female patients were of slightly older age (*M*= 36.3, Median= 32) than males (*M*= 35, Median= 31) as shown in Table 6.23.

Table 6.23 Patients' average age by gender 2010-11

	M	***SD***	**Median**	**Total** (N)
Female	36.3	24.8	32	595 561
Male	35	24.5	31	639 050
All	**35.6**	**24.7**	**32**	**1 234 669**

Figure 6.4 illustrates the utilisation rate per 1000 persons for patients attending emergency departments in Queensland by their age mix. The utilisation rate was calculated for each of the age groups using ABS population figures for Queensland (ABS, 2010a). Age groups 85 and above (533), 0-4 (464), and 80-84 (447) had the highest utilisation rates, and 55-59 (200), 50-54 (206), and 45-49 (212) the lowest. Emergency department utilisation follows a trimodal pattern with respect to age with peaks in infancy, young adulthood and older age.

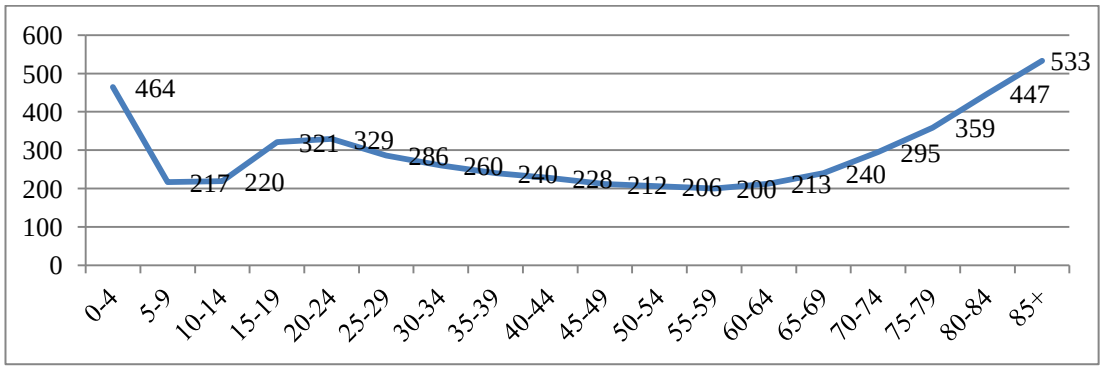


Figure 6.4 Emergency department utilisation rates per 1000 persons by patients' age group: 2010-11

The utilisation rates were further examined according to age groups together with patients' gender as shown by Figure 6.5. Male patients were higher users of emergency departments in the majority of age categories except for 20-29 year old group where females' utilisation rate was higher (319 compared to 296).

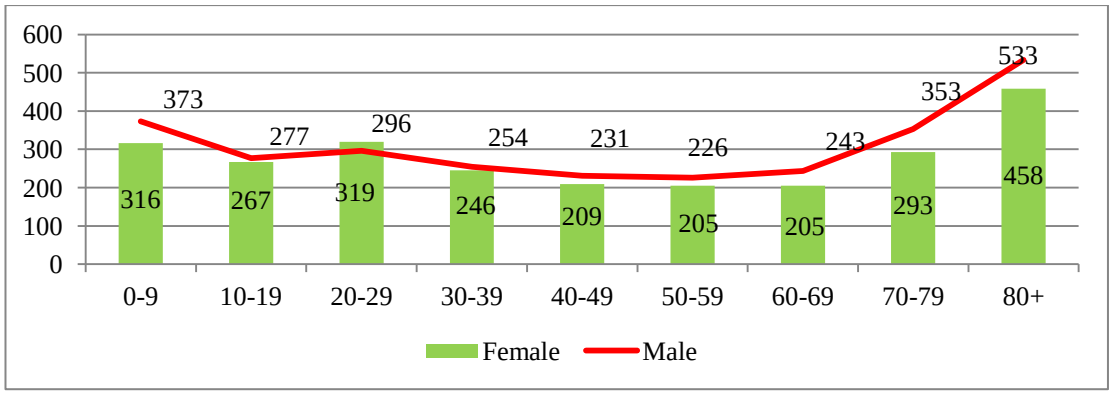


Figure 6.5 Emergency department utilisation rates per 1000 persons by patients' age and gender 2010-11

To investigate possible reasons behind higher utilisation rates by females in 20-29 years age group further examination of ICD codes was performed. The difference between male and female presentations, as related to specific diagnostic conditions, was calculated for both 20-29 year old group and the remaining age groups (Table 6.24). In the 20-29 year old age group, female patients had considerably higher presentations than males for conditions related to respiratory system, infectious and parasitic problems, ear conditions, injuries and poisoning, and skin related illnesses.

Table 6.24 Difference between ED utilisation by female and male according to ICD codes

	Difference between females & males*%	
	20-29yo	All other ages
X-Respiratory system	7.4	<0.1
I-Infectious and parasitic	6.0	0.6
VIII- Ear and mastoid process	3.2	0.1
XIX- Injury & poisoning etc	0.7	-8.0
XII- Skin and subcutaneous tissue	0.6	-0.8
XIV- Genitourinary system	0.2	2.9
XVII- Congenital malformations deformations etc	<0.1	<0.1
XVI- Conditions originating in perinatal period	0.0	0.0
XV- Pregnancy childbirth and puerperium	0.0	2.5
VII- Eye and adnexa	-0.1	-0.1
III-Blood	-0.1	0.1
IV- Endocrine, nutritional	-0.3	0.1
XX- External causes of morbidity and mortality	-0.4	0.1
II-Neoplasms	-0.5	-0.2
VI- Nervous system	-0.6	0.5
XXI- Factors influencing health status etc	-1.5	-0.6
XIII- Musculoskeletal system and connective tissue	-1.8	-0.3
XI- Digestive system	-2.5	0.5
XVIII- Abnormal clinical and laboratory findings nec	-3.1	2.5
V- Mental and behavioural disorders	-3.4	<0.1
IX-Circulatory system	-3.8	-0.1

* A positive percentage shows that females had higher presentation in that category than males.

Since injuries and poisoning constituted a large proportion of emergency department and ambulance workload (see Table 6.21), and as showed, the highest difference

between the age group 20-29 and others rested in this diagnostic category, this chapter was further examined to find out if particular problems related to women are highlighted in this age group. This was achieved by using the Barell Matrix (Fingerhut & Warner, 2006) as a tool to classify and organise injury diagnosis data into meaningful groupings by nature of injury and body region. To make the analysis more meaningful, a comparison was made between the 20-29 year old group with adjacent age groups (10-19 and 30-39 years). Table 6.25 shows the results. Dislocations, sprains and strains were the most common reasons for which patients in the injury chapter had attended emergency departments, and females outnumbered males in all age groups. Therefore this could not be considered as a specific explanation for higher utilisation rate of females in the 20-29 age group. However, 20-29 year old female patients presented more often than males with problems related to poisoning and adverse effects (by 2.9% and 2.8% respectively) and this was unique to this age group. The proportion of presentations between genders was higher for this specific age group when compared to corresponding age groups (10-19 and 30-39 years) and all patients.

Table 6.25 Distribution of Injuries Chapter by nature of injury 2010-2011

	10-19yo		**20-29 yo**		**30-39yo**		**All patients**	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Dislocation, sprains, strains	39.6	29.0	36.3	27.3	36.3	27.3	31.9	24.7
Poisoning	3.6	0.9	5.1	2.2	5.0	2.8	3.5	1.9
Adverse effects	2.8	1.2	4.3	1.5	4.0	1.9	3.5	2.0
Other injuries*	54.0	68.9	54.3	69.0	54.7	68.0	61.1	71.4

*Only top three groups listed. Other 15 categories not listed here due to small percentages

Analysis of injuries by body region shown in Table 6.26 also confirms that the biggest difference (8%) between females and males in the 20-29 years category exists in system-wide related diagnoses (including in this definition poisoning, other effects of external causes such as submersion or asphyxiation and other toxic effects).

Table 6.26 Distribution of Injuries Chapter by body region: 2010-2011

	10-19yo		20-29 yo		30-39yo		All patients	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
System-wide	10	4.2	15.1	7.1	15.4	9.0	12.4	8.5
Vertebral column	6.7	3.9	10.8	5.8	12.2	8.3	9.1	6.3
Other lower extremity	27.7	24.7	26.5	21.8	25.9	20.9	23.0	20.2
Other areas*	55.6	67.2	47.6	65.3	46.5	61.8	55.5	65.0

*Only top three groups listed. Other 14 areas not listed here due to small percentages

6.3.2 Socio-economic characteristics

The socio-economic and ethnic status of patients attending emergency departments was examined. Table 6.27 presents patients' employment status by the acuity of their condition. It is to be noted that data related to employment status is the most incomplete variable in the data set provided, with 51% of missing records (for more details please see Table 5.2). Further 17.5% patients had not stated their employment status therefore any conclusion based on this variable could be only speculative. Among the higher acuity categories (triage 1-2), pensioners had higher presentations, while in the lower acuity categories (triage 4-5) patients were more likely to be employed.

Table 6.27 Employment status per triage category 2010-11

	Triage category (%)					
	1	2	3	4	5	**Total**
Child not yet at school	5.3	6.9	11.6	10.3	5.6	10.0
Student	5.5	5.4	10.4	15.7	13.0	12.2
Employed	19.4	23.5	24.6	31.2	32.8	27.7
Unemployed	5.5	3.7	4.4	4.8	7.4	4.8
Home duties	2.8	3.8	4.8	5.0	4.7	4.7
Pensioner	22.2	24.2	18.0	11.7	13.6	15.8
Other	7.9	9.7	8.2	6.1	4.5	7.2
Not stated- unknown	31.5	22.8	17.9	15.3	18.5	17.5
Total (N**)**	**5 333**	**62 707**	**244 241**	**245 321**	**49 137**	**606 739**

Patients were also asked to identify if they consider themselves Indigenous. Table 6.28 shows the number of Indigenous patients attending emergency departments in 2010-11. The total of 5.7% patients who came to emergency departments identified themselves as Indigenous compared to 92.6% non-Indigenous population. Based on the ABS population projection for Aboriginal and Torres Strait Islander Australians for 2011 in Queensland (ABS, 2009), the utilisation rate for Indigenous groups (incorporating Aboriginals and Torres Strait Islanders) was 421 per 1000 people. The

utilisation rate for non-Indigenous population was noted as 259 per 1000 persons using the ABS demographic statistics (ABS, 2011) for UR calculations.

Table 6.28 Indigenous status of presenting patients 2010-11

	N	%
Aboriginal not Torres Strait Islander	57 514	4.7
Torres Strait Islander not Aboriginal	6 803	0.6
Aboriginal and Torres Strait Islander	5 112	0.4
Not Indigenous	1 142 751	92.6
Not stated- Unknown	21 328	1.7
Total	**1 233 508**	**100.0**

The comparison between triage categories and Indigenous status demonstrated in Table 6.29 does not show any considerable differences apart from slightly higher proportion of presentations for Indigenous population in lower acuity triage categories 4 and 5 as compared to non Indigenous population.

Table 6.29 Indigenous status per triage category 2010-11

		1	2	3	4	5	Total (N)
Aboriginal not Torres Strait Islander	%	0.8	8.4	35.4	45.4	10.0	**57 495**
Torres Strait Islander not Aboriginal	%	1.1	10.2	36.0	44.5	8.2	**6 803**
Aboriginal and Torres Strait Islander	%	0.7	7.0	36.2	45.6	10.4	**5 112**
Not Indigenous	%	0.8	10.2	39.8	41.2	8.0	**1 142 204**
Not stated- Unknown	%	4.9	15.0	37.8	33.5	8.8	**21 313**

Patients are also asked to declare their health insurance status as shown in Table 6.30. The vast majority of patients (84.7%) declared Medicare as their only health insurance, while 97.9% of the population were enrolled in Medicare as of 30 June 2010 (Australian Goverment, 2010). Just above 12% of the patients acknowledged having a private health insurance, despite the fact that around 43% of the population have private basic hospital cover in Queensland (Private Health Insurance Administration Council, 2011).

Table 6.30 Patients insurance status 2010-11

	N	%
Medicare only	1 044 621	84.7
Private health insurance	150 162	12.2
Other insurance	17 171	1.4
Unknown health insurance status	11 156	0.9
Travel insurance	1 716	0.1
Total	**1 234 010**	**100.0**

EDIS data also contained information regarding patient's place of birth. In 2010-11 there were over 250 different countries of origin recorded. Table 6.31 shows utilisation rate per 1000 people, where number of presentations to emergency

departments was compared with number of people born outside of Australia for each country, as indicated in the ABS Census data in 2006 (ABS, 2006b). The Indian population presented the highest utilisation rate. The utilisation rate for patients born in Australia was above those born in New Zealand, the Philippines and the UK, but on similar level to all other remaining countries combined.

Table 6.31 Utilisation rate by country of birth in 2010-11

Country of birth	UR per 1000 people
India	522
Australia	305
New Zealand	289
Philippines	250
UK	213
Other countries	309

Patients were also asked to identify languages other than English spoken at home. The EDIS data indicates that 98.2% speak English only at home, and 1.8% communicate in other languages. The data accuracy for this variable remains questionable, as close to 28% of Australian population has been born overseas (Queensland Goverment, 2006). Potentially the methods of recording this information by staff in EDs were not precise and should be evaluated in the future. The utilisation rates calculated for this variable shows big gap with utilisation rate for English speaking patients (359 per 1000) and for patients speaking other languages (74 per 1000), as calculated based on 2006 data from QLD Government Office of Economics and Statistical Research (Queensland Goverment, 2006). The accuracy of data remains unclear.

Patients' residential postcodes were also obtained and analysed according to the Socio-Economic Index for Areas (SEIFA) (Pink, 2008). The Index of Relative Socio-economic Advantage and Disadvantage (IRSAD) was used to calculate utilisation rate for areas. Figure 6.6 compares utilisation rates for users from the most advantaged (highest number) and the most disadvantaged (lowest number) localisations. The three most advantaged areas (8-10) noted consistently the lowest utilisation rates and areas 2-4 and 6-7 had the highest utilisation rates of emergency departments.

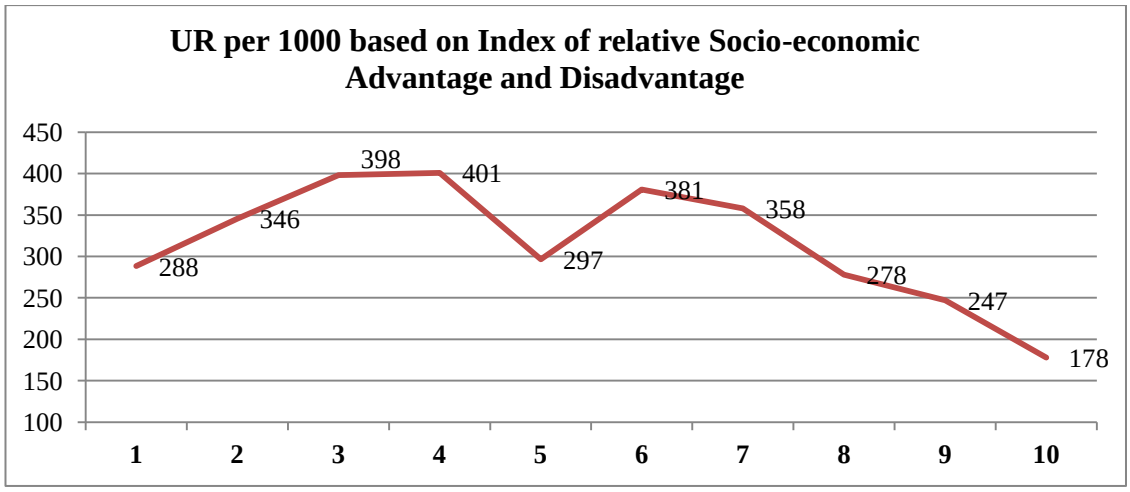


Figure 6.6 UR per 1000 based on Index of relative Socio-economic Advantage and Disadvantage

6.4 UTILISATION TRENDS BY SEASONAL VARIATIONS

The examination of variations between patients' presentations during the year revealed equal distribution between the months of the year. February had the lowest percentage of presentations possibly due to fewer days in this month. Therefore the number of presentations was adjusted according to the number of days per month. Figure 6.7 shows the results. In 2003-04, the lowest average number of presentations occurred during June and October (2131 and 2135), and peaked in August (2391). The demand remained stable between December and April. However, in 2010-11, the June-July period reported the lowest average number of presentations (2362 and 2499) despite being the flu season, but demand remained evenly distributed throughout the rest of the year.

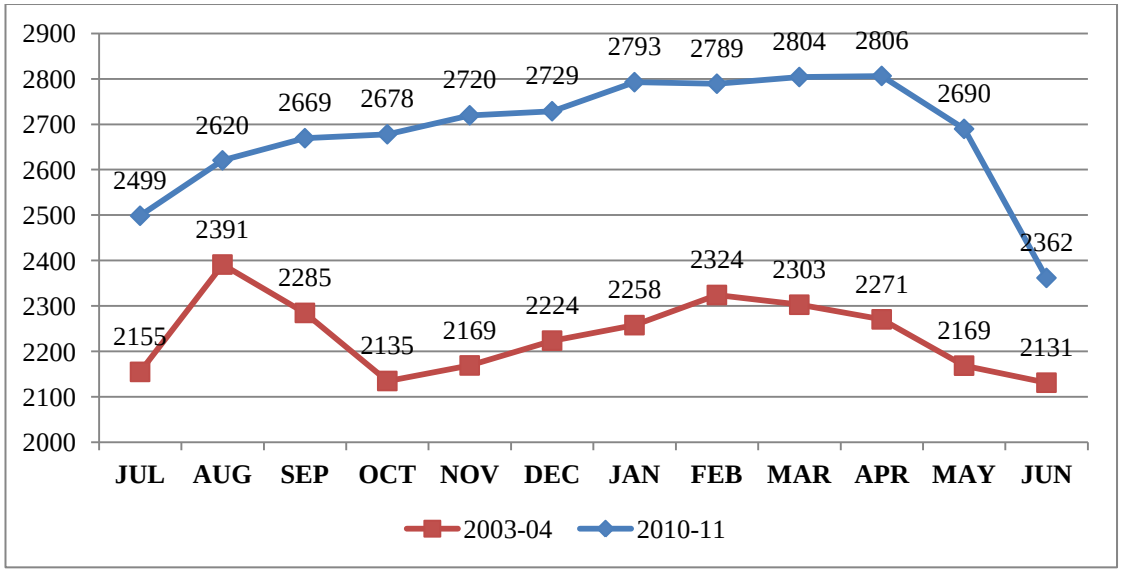


Figure 6.7 Average number of daily presentations per month: 2003-04 and 2010-11

6.5 SUMMARY

In summary, the various characteristics related to the emergency department visit and its users are presented in this chapter. The opening sections discuss differences in time of presentations, urgency and epidemiology of patients attending the emergency departments. It also studies health system related factors such as referral system and insurance status. Subsequently, investigates socio-demographic characteristics of users and their cultural backgrounds. Lastly, looks at seasonal variations of the emergency department visits.

A number of important findings were established through the analyses. Firstly, an increase in demand for emergency department services had been observed in all age groups and, in the majority of cases, is higher for males than females. Secondly, an increase was also observed among more urgent triage categories and among patients who decided to seek care of their own initiative. Thirdly, patients from lower socio-economic backgrounds and patients holding only Medicare as their health insurance had higher utilisation rates of public emergency departments. Finally, the impact of other issues e.g. cultural backgrounds remains unclear.

Significant findings and observations from these analyses will be discussed in detail in the final chapter (see Chapter 9).

Chapter 7: Results Study two: Characteristics of study sample and results of descriptive analyses

7.1 INTRODUCTION

Chapter 7, which includes the results of the first part of Study two, begins with the presentation of data collection results including response rates, representation of the study sample, and discusses the demographic profile of participants and patients. In the second part of the chapter, results from descriptive analyses performed for all variables are discussed. Subsequently, the chapter discusses which of the variables underwent some transformation and how this occurred for the purpose of further statistical analyses.

7.2 RESPONSE RATE

There were 1608 patients in all eight emergency departments during the data collection phase. Data collectors were able to approach 1361 (85%) of these patients and seek their consent to participate in the study. The remaining 15% of patients present at the emergency departments, were not approached by data collectors for a number of reasons including the patient being under staff examination, the patient taken from the emergency department for external tests, or patients being temporarily away from their assigned beds.

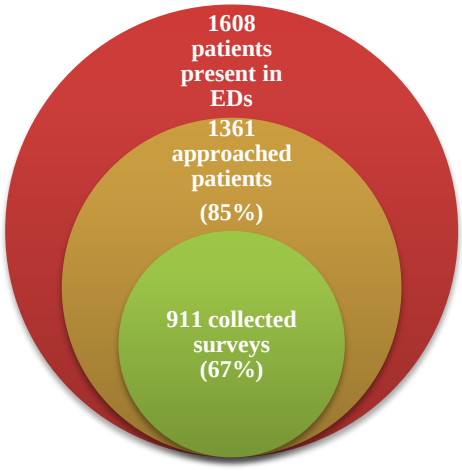


Figure 7.1 Response rate

As illustrated in Figure 7.1, 911 valid questionnaires were collected out of 1361 patients who were invited to complete the questionnaire, which represents a 67% response rate. There were 687 adult and 226 parent questionnaires returned, although two of the parent/guardian forms were discarded for being completed by an incorrect person. 900 questionnaires were collected from emergency departments and 11 questionnaires were sent back to the research team by mail. One third of the patients approached refused to participate in the study. The following reasons were provided for non-participation: being too unwell (n=41), not having time, discharged or busy with kids (n=17), mental health or intoxicated (n=10), under-age without accompanying parents (n=4), and non-English speaker (n=3).

7.3 REPRESENTATIVENESS OF SAMPLE AND DEMOGRAPHIC PROFILE OF RESPONDENTS

7.3.1 Representativeness of sample

The number of questionnaires collected from each of the eight participating emergency departments varies but in general corresponds proportionally with their size. Table 7.1 details the numbers of collected questionnaires and compares the proportion of collected questionnaires in the sample to the proportion of patients' presentations to emergency departments according to EDIS data for 2010-11. The distribution of percentages in the sample of 911 questionnaires remains similar to the distribution of percentages of presentations in the EDIS data. The highest number of 215 collected questionnaires comes from Royal Brisbane Women's Hospital, which accounts for almost a quarter of all questionnaires. The smallest number of 35 questionnaires, was obtained from Innisfail Hospital (3.8%).

Table 7.1 Number of questionnaires collected from each site and patient presentations in 2010-11

	N	**%**	**EDIS 2010-11 (%)**
Innisfail Hospital	35	3.8	3.6
Mater Children's Hospital	81	8.9	12.5
Nambour Hospital	104	11.4	10.7
Redland Hospital	130	14.3	14.1
Royal Brisbane Women's Hospital	215	23.6	21.2
Toowoomba Hospital	131	14.4	12.6
Townsville Hospital	162	17.8	18.7
Wynnum Hospital	53	5.8	6.6
Total (N)	**911**		**338 066**

Similarly, Table 7.2 compares the proportion of collected questionnaires with patients' presentations based on EDIS data for 2009-10, according to the geographical localisation of the emergency departments. The percentages of distribution correspond closely between these two groups. Over half of the questionnaires (52.6%) were collected from emergency departments from major cities, which equates to 54% of the yearly presentations made in 2009-10 by patients to major city emergency departments.

Table 7.2 Comparison between number of collected questionnaires and patient presentations according to geographical localisation

	Collected sample of 911 questionnaires		**Patients' presentations for 8 hospitals for 2009-10**	
	N	%	N	%
Major cities	479	52.6	177 301	54
Inner regional	235	25.8	77 153	24
Remote	197	21.6	71795	22
Total (N)	**911**		**329 249**	

Figure 7.2 compares the distribution of presentations to emergency departments based on EDIS data for the 2010-11 financial year with the percentage of collected questionnaires during the data collection process according to the respective days of the week. Despite the differences between particular days with the highest discrepancy on Friday (11.6%), the percentage of collected questionnaires and distribution of patients' presentations during weekdays and weekends remains similar. Between Monday and Thursday inclusive, there were 56.4% patient presentations based on EDIS data versus 53.1% of collected questionnaires. There was 43.6% versus 46.6% respectively during weekends.

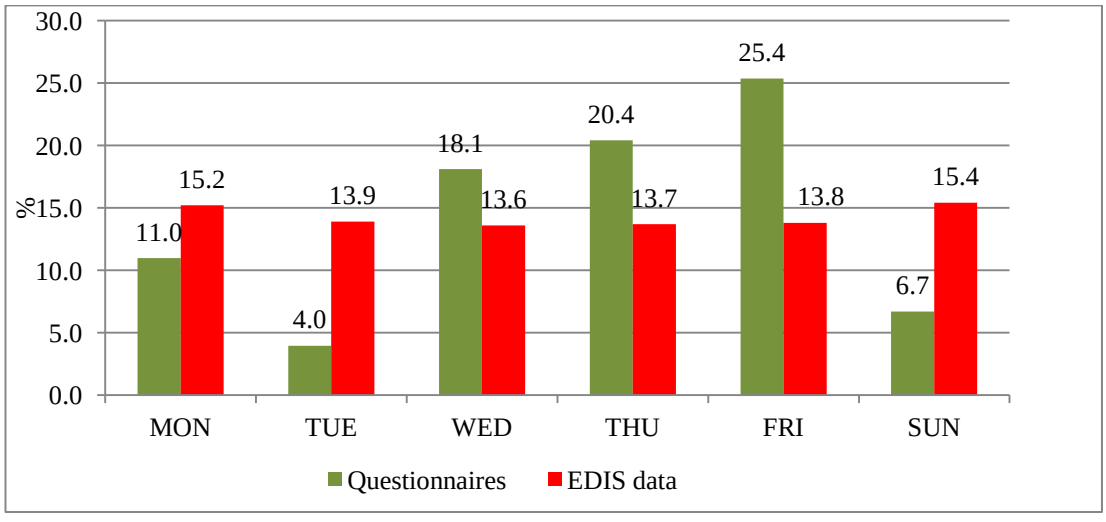


Figure 7.2 Comparison between the distribution of patients' presentations and questionnaires collected according to the day of the week

In 2010-11, 26.6% of presentations to the emergency departments were made by patients 17 years old or younger, and 73.4% were made by adults. Figure 7.3 compares these proportions with ratios of collected questionaries from adult patients and parents/guardians on behalf of their children. There were 24.6% of parent/guardian and 75.4% of adult questionnaires, which is comparable to proportions of EDIS presentations by adults and by children.

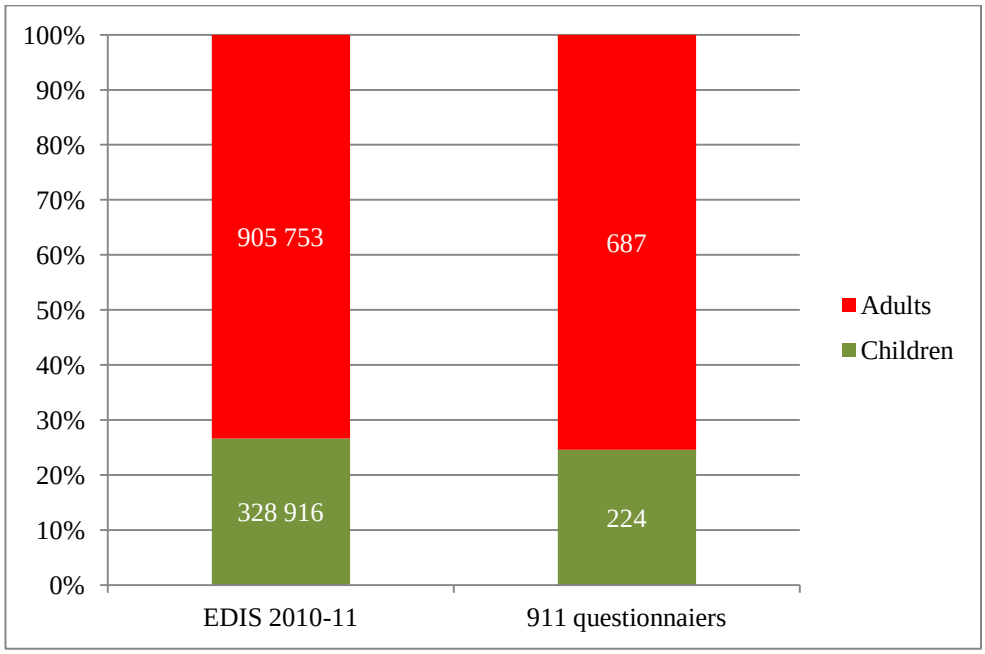


Figure 7.3 Comparison between the proportion of collected questionnaires and EDIS presentations according to adult and children groups

7.3.2 Demographic profile of patients and participants

This section illustrates demographic characteristics of the different subgroups of respondents. It should be noted that the two terms used of "patients" and "participants" refer to two different groups of respondents. The first one "patients" represents adult and children as patients (17 years old and younger), while the second one "participants" includes adult patients and parents or guardians of underage patients who were completing the questionnaire on behalf of their youngsters. A number of comparisons were made between the EDIS data from 2010-11 and the two study samples. The first sample consisted of a total of 911 questionnaires, while a second comprised a smaller sample of 464 questionnaires (51%) obtained from participants who gave their consent to access additional information required regarding their visit from the hospital records.

7.3.2.1 Age and gender of patients and participants

In the total sample of 911 patients there were 402 females (47%) and 445 males (53%), which closely corresponds with EDIS data for 2010-11 which recorded 595,561 (48%) presentations made by females and 639,050 (52%) made by males. The proportion of females and males reversed in the participants group with 54% females (464) and 46% males (403) and thus differs to EDIS data. This was potentially influenced by a large percentage of mothers accompanying their children to the emergency department and participating in the research study.

Table 7.3 presents a comparison between patients' age and gender. On average females in the study sample were a year younger (*M*=35.7, Median = 31) than females from EDIS data (*M* = 36.6, Median 32). This was also contrary to males, who were slightly older in the study sample than in the EDIS data (*M*= 35.9, Median= 33 versus *M*=35, Median =31). The overall age of patients on average, however, was almost identical from the aforementioned two datasets (*M*=35.6 versus *M*=35.8 and Median =32 for both).

Table 7.3 Comparison of ED patients' average age by gender: 2010-11 and 911 questionnaires

	EDIS 2010-11				**911 questionnaires**			
	M	*SD*[1]	*Median*	*N*	*M*	*SD*[1]	*Median*	*n*
Female	36.6	24.8	32.0	**595 561**	35.7	24.6	31	**402**
Male	35	24.5	31.0	**639 050**	35.9	23.4	33	**445**
All	**35.6**	**24.7**	**32.0**	**1 234 669**	**35.8**	**23.9**	**32**	**847**

[1]Standard Deviation

Figure 7.4 illustrates the distribution of patients in the study sample and in the EDIS data according to different age groups. It can be seen that some of the age groups are better represented than others. The group in the study sample, which has the largest under representation to normal attendance patterns, is the youngest group of patients (0-9 years old) with 1.7% difference. The second largest under representation is for those patients' aged 70-79 amounting to 0.8%. The two most overrepresented groups are patients aged 20-29 and 60-69 with 1.2% and 0.7% increase from normal attendance patterns respectively. Overall, however, there was no much of a discrepancy between the distributions of age groups in the study sample compare to 2010-11 EDIS data.

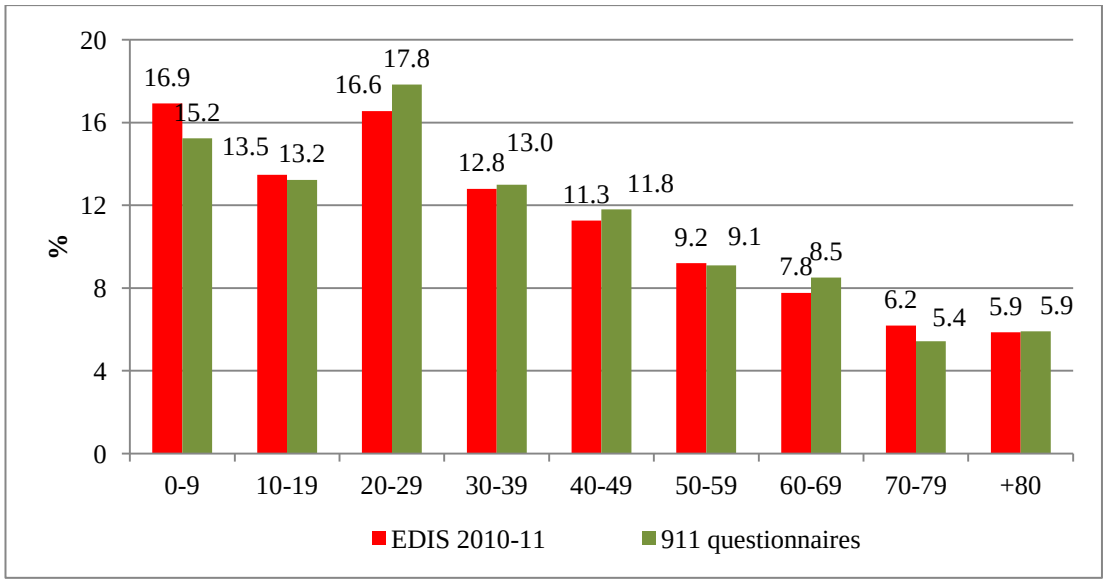


Figure 7.4 Comparison between the study sample and EDIS data according to age groups

7.3.2.2 Indigenous status

There was a considerably higher percentage of missing data for this category in the study sample (7%) in comparison to EDIS data (1.7%) as presented in Table 7.4 Thus, it is difficult to determine whether the proportions of Indigenous and non-Indigenous patients differed from EDIS data.

Table 7.4 Comparison of Indigenous status

	EDIS 2010-11		**911 questionnaires**	
	N	%	n	%
Non-Indigenous	1 142 751	92.6	805	88.4
Aboriginal	57 514	4.7	32	3.5
Torres Strait Islander	6 803	0.6	4	0.4
Aboriginal and Torres Strait Islander	5 112	0.4	6	0.7
Unknown	21 328	1.7	64	7
Total	**1 233 508**		**911**	

7.3.2.3 Characteristics of minor patients

According to the research design and ethical clearances obtained for this study, patients below 17 years of age were not permitted to participate in the research. Instead, their parents or legal guardians were included as study participants. The parents/guardians questionnaire, however, included seven more questions related mainly to a patient's (child) demographics and relationship with the parent/guardian. Below is the summary of findings related to young patients' characteristics.

Figure 7.5 represents patients' age with 41.3% presenting children 4 years old or younger, and three almost equal age groups: 5-9yo accounted for 20.7%, 10-14yo accounted for 25.5% and 15-17yo accounted for 12.5%.

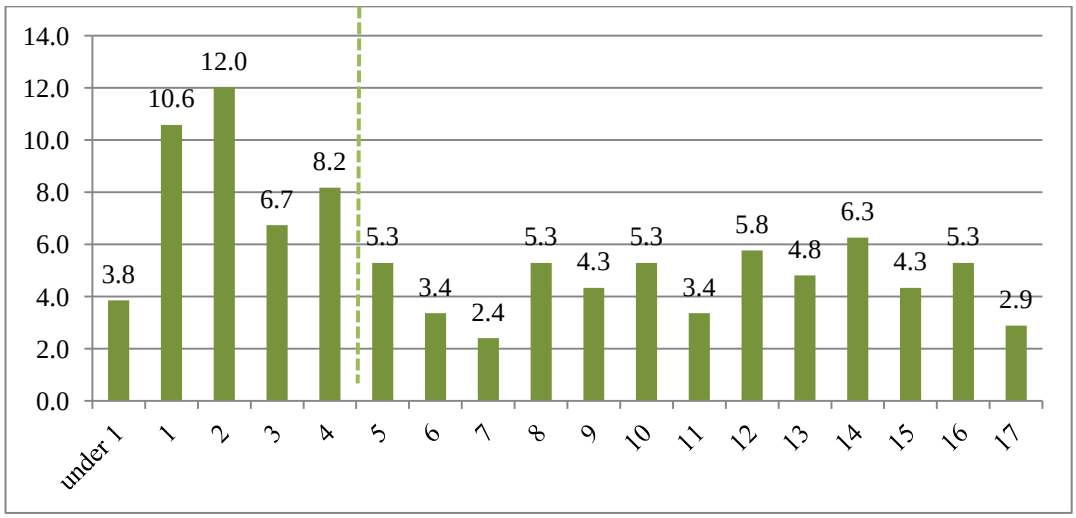


Figure 7.5 Distribution of age in children

Figure 7.6 highlights the differences between the proportion of boys and girls in their age groups. Across all age groups, boys are in the majority. This tendency is steady and accounts for a rise to almost 31% of a difference between boys and girls age between 15-17 years of age.

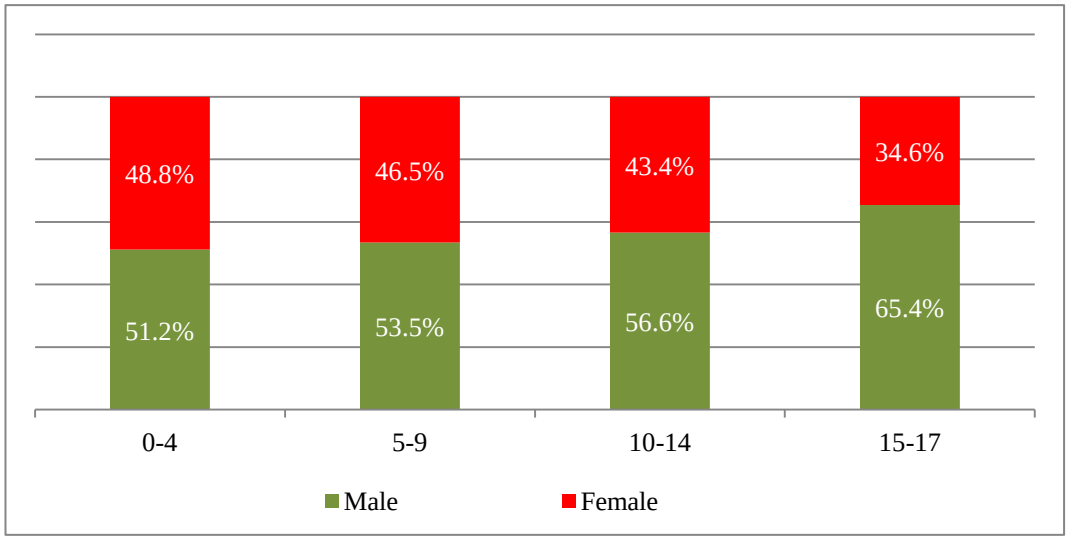


Figure 7.6 Distribution among children according to age and gender

Children who were presenting to the emergency departments during the data collection were typically accompanied by one of their parents: mother (68%) or father (26%) and generally lived with both (80.2%) or one of the parents (19.8%). Only 2.3% of young

patients were accompanied by a grandparent, with a further 2.8% by a legal guardian, and less than 1% by another family member. The vast majority of young patients were born in Australia (95%) while others migrated from countries such as England (1.6%), Ireland (0.7%), New Zealand (0.9%), South Africa (0.6%), PNG (0.8%), and the USA (0.4%).

7.3.2.4 Insurance status

In addition to demographic characteristics, participants were also asked to indicate what types of health insurance they were covered with. There were notable differences between participants' health insurance coverage as illustrated in Table 7.5. Those participants indicating Medicare as their only health insurance were underrepresented by 24% when compared to EDIS data. This was contrary to the situation of participants with private health insurance who were overrepresented in comparison to EDIS data by 19%.

Table 7.5 Comparison of health insurance

	EDIS 2010-11		**911 questionnaires**	
	N	%	n	%
Medicare only	1 044 621	84.7	553	60.7
Private insurance	150 162	12.2	284	31.2
Travel insurance	1 716	0.1	6	0.7
Other	17 171	1.4	21	2.3
No Medicare	9 184	0.7	8	0.9
Unknown	11 156	0.9	39	4.2

7.3.2.5 Additional data from participants' hospital records

Participants were asked to give consent to access additional information related to their visit recorded in the EDIS system. Just over 50% of participants gave consent. Some supplementary analyses based on this information are presented below.

The representation of patients according to their triage category varied between the study sample and the EDIS data as illustrated in Table 7.6. Patients who were assigned triage categories 1, 2, and 3 were underrepresented in the study sample. Triage category 4 patients, however, were overrepresented by 11%. Overall, there were 9.5% less patients in triage category 1-3, and 10.5% more patients in triage category 4-5 in comparison to the EDIS data.

Table 7.6 Patients' triage category according to the study sample and EDIS data

	EDIS 2010-11		**Questionnaires with additional information**	
	N	%	n	%
Triage 1	10 731	0.9	1	0.2
Triage 2	125 252	10.1	27	6.5
Triage 3	487 671	39.5	139	33.3
Triage 4	510 292	41.3	218	52.3
Triage 5	100 143	8.2	32	7.7
Total (N)	**1 234 089**		**417**	

The overall median length of stay for patients' (measured between time of arrival to the emergency department and discharge) according to triage categories was three a half hours. Patients from triage category 2 on average spent the longest time in the emergency department before being discharged as illustrated in Table 7.7.

Table 7.7 Patients' length of stay according to triage categories in the study sample

	Length of stay from Arrival to Discharge (in minutes)					
	M	Quartile 1	Median	Quartile 3	*SD*[1]	Total (N)
Triage 1						1[2]
Triage 2	478	201	317	476	502.9	23
Triage 3	422.9	160	293	489	465.1	127
Triage 4	285.8	119.5	182	300	320.1	201
Triage 5	148.5	80	117.5	197.5	109.1	32
Total (N)	**331.1**	**127**	**212**	**382**	**385.2**	**384**

[1]Standard deviation

[2]There was only one case for triage category 1 with duration of stay of 271 minutes

Subsequently, comparison between the median length of stay showed a 36-minute longer time period spent in the emergency departments by patients in the study sample than in EDIS data as presented in Table 7.8.

Table 7.8 Patients' length of stay according to the study sample and EDIS data

	Length of stay from Arrival to Discharge (in minutes)					
	M	Quartile 1	Median	Quartile 3	*SD*[1]	Total (N)
EDIS	256.6	91	174	319	267.2	1 232 690
QNRS	**331.1**	**127**	**212**	**382**	**385.2**	**384**

[1]Standard deviation

Table 7.9 presents details regarding patient waiting times from triage to treatment for each of the triage categories. The average time that patients were waiting before receiving treatment was just over one hour. The median time for each of the triage categories indicates, however, that only patients' categories 1, 2, and 5 were seen within the recommended maximum waiting time (ACEM, 2000).

Table 7.9 Patients' waiting times according to triage categories in the study sample

	Waiting time from Triage to Treatment (in minutes)					
	M	Quartile 1	Median	Quartile 3	*SD*[1]	Total (N)
Triage 1						1*
Triage 2	14.4	5	7	19	16.8	23
Triage 3	46.9	13.6	40	67	39.7	126
Triage 4	84.4	32.5	63	121	69.6	189
Triage 5	67.1	24	65.5	104.3	46.9	28
Total (N)	**65.5**	**23**	**48**	**92**	**60.6**	**367**

[1]Standard deviation

*There was only one case for triage category 1 with a duration of 1 minute between triage and treatment

Similarly, the investigation of waiting times to receive a treatment indicated that patients in the study sample waited on average close to 10 minutes longer as compared to data from EDIS and as detailed in Table 7.10.

Table 7.10 Patients' waiting times according to the study sample and EDIS data

	Waiting time from Triage to Treatment (in minutes)					
	M	Quartile 1	Median	Quartile 3	*SD*[1]	Total (N)
EDIS	56.1	12	32	80	66.7	1 171 902
QNRS	**65.5**	**23**	**48**	**92**	**60.6**	**368**

[1]Standard deviation

Table 7.11 presents a comparison between patients' discharge status. The two groups of patients: those admitted to hospital wards and those admitted to an observation ward, were overrepresented in the study sample by 3% and 5.3% respectively. All other groups of patients were underrepresented, including patients for whom the treatment was finalised. They were duly discharged from the emergency department. There was a 3.3% difference compared to the EDIS data for this group.

Table 7.11 Patients' discharge status according to the study sample and EDIS data

	EDIS 2010-11		**Questionnaires with additional information**	
	N	%	n	%
Admitted	221 938	18.5	83	21.6
ED service event completed-discharged	820 506	68.2	250	64.9
Transfer to another hospital	25 588	2.1	3	0.8
Did not wait	66 071	5.5	8	2.1
Left after treatment commenced	19 813	1.6	4	1.0
Died in ED	766	0.1	1	0.3
Admitted to DEM	13 744	1.2	5	1.2
Admit to OBS ward	34 143	2.8	31	8.1
Total (N)	1 202 684		385	

Patients were asked to indicate what priority they thought they should be given considering their own condition prior to the commencement of treatment. Table 7.12

presents patients' perceptions of the urgency of their own health problem and compares it with the actual triage category assigned to patients by the triage staff. It shows clearly that close to 29% of patients wanted to be seen within 10 minutes in comparison to 7% that were identified by the health staff as such urgent cases. Interestingly, almost 1/3 of patients volunteered to wait 30 minutes, which corresponded closely with triage category 3 given to them by the triage nurse. Over 60% of the patients were assigned triage category 4 or 5, but less than half of them felt they could wait an hour before receiving treatment.

Table 7.12 Comparison between patients' actual triage category and patients' own perception of priority in the study sample

Triage Category/Priority	**Patients Perception of Priority**		**Actual Triage Category**	
	N	%	N	%
1/Immediately	53	13.1	1	0.2
2/Within 10 minutes	63	15.5	27	6.5
3/Within 30 minutes	129	31.8	139	33.3
4/Within 1 hour	100	24	218	52.3
5/Within 2 hours	61	14.6	32	7.7
Total (N)	**406**		**417**	

Further, Table 7.13 shows the frequency and percentages of priority levels perceived by patients against their actual assigned triage categories by triage nurses. Patients with triage categories 3, 4, and 5 appear to have generally higher expectations about the timeliness of the response to their conditions than the nurse assigned ATS implies. Interestingly, only in the cases of patients assigned triage category 2, most perceived their priority as less urgent compared to a slightly smaller group of patients who perceived their condition as more urgent than assessed by the triage nurse (12 versus 11).

Table 7.13 Frequency and percentage of priority perceived by patients and their actual triage category

Actual Triage Category		**Priority Perceived by Patients**				
	N	1 N (%)	2 N (%)	3 N (%)	4 N (%)	5 N (%)
1	1	1				
2	27	11 (40.7)	4 (14.8)	6 (22.3)	4 (14.8)	2 (7.4)
3	134	27 (20.1)	31 (23.2)	45 (33.6)	21 (15.7)	10 (7.4)
4	213	12 (5.6)	25 (11.8)	68 (31.9)	68 (31.9)	40 (18.8)
5	31	2 (6.4)	3 (9.6)	10 (32.3)	7 (22.6)	9 (29.1)

To investigate if there was a statistically significant difference between the patients'

perception of the urgency of their health problem and the actual triage category given by the triage staff, the Cohen's Kappa and Spearman's rho statistics were used to measure the interrater agreement. The Kappa = 0.07 ($p<0.01$) and Spearman's rho = 0.34 ($p<0.01$) indicated that there was no to low agreement between the patients and triage staff over what priority should have been allocated to the condition (Note: both measures range between 0= no agreement, and 1= perfect agreement (Cohen, 1988)). However, since only half of the patients consented for their emergency department records to be accessed, the finding should be interpreted within this limitation.

7.3.3 Summary

The above section illustrates characteristics of the study sample in comparison to the data for the emergency departments collected in EDIS. In short, the response rate achieved in the study was 67%. Overall, the comparisons made between the study sample and EDIS data demonstrated a close similarity according to the geographical location of the emergency departments and days of the week when the data was collected. It was also suggested that the distribution of adult and children participating in the study sample was not very divergent from EDIS data.

Comparisons made based on patients' and participants' demographic characteristics showed a satisfactory representation of patients according to their gender and age in the study sample. There were discrepancies between participants holding private health insurance and Medicare only between the two datasets. Analysis of additional information from patient records based on the smaller sample showed considerable differences between patients' triage categories. Over half of the patients being assigned a triage category 4 from the study sample consequently experienced longer waiting times and lengths of stay in the emergency departments as compared to the EDIS data. Almost one-third of patients were admitted to hospital or an observation ward, which was a higher proportion, compared to the EDIS data recording of 21% of admissions per year. There was a considerable difference (22%) between a perceived priority by patients and the triage category assigned to them. Further, the correlation analysis performed between these two factors confirms that patients' perception of the urgency of their health problem does not correspond significantly with the priority accorded them by medical staff at the time of triage.

7.4 RESULTS OF DESCRIPTIVE ANALYSES FOR ALL VARIABLES

7.4.1 Independent factors

Socio-demographic factors have been commonly quoted and described in recent literature as impacting on the demand for emergency department services. In this study, several socio-demographic factors were chosen for a multi-level analysis to provide a broad picture and add strength to understanding the links between individuals and the utilisation of emergency department services. These include:

7.4.1.1 Age

Age was a continuous variable measured in yearly increments ranging from 15 to 98 years. Figure 7.7 shows the age distribution within the total sample (n = 851) with 60 missing values, a mean of 43 years (SD=18.36), and a median of 40 years for the entire sample group. For the multivariable analysis age was used as a continuous variable.

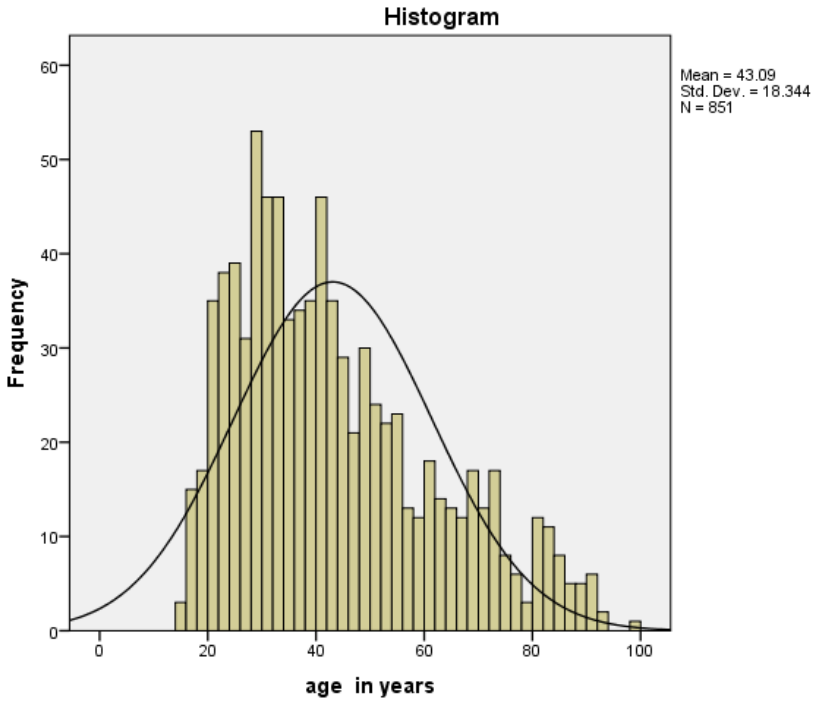


Figure 7.7 Age distribution of respondents

7.4.1.2 Gender

There were 403 male respondents (46.5%) and 464 female respondents (53.5%) in a total sample of 867 cases with 44 missing values (4.8%).

7.4.1.3 Income

The income distribution among respondents is presented in Figure 7.8 with the highest percentage of respondents (16.4%) indicating their total household income was between $600-799 a week. It should be noted, however, that this variable is of limited value as 21% of respondents did not provide information about their income.

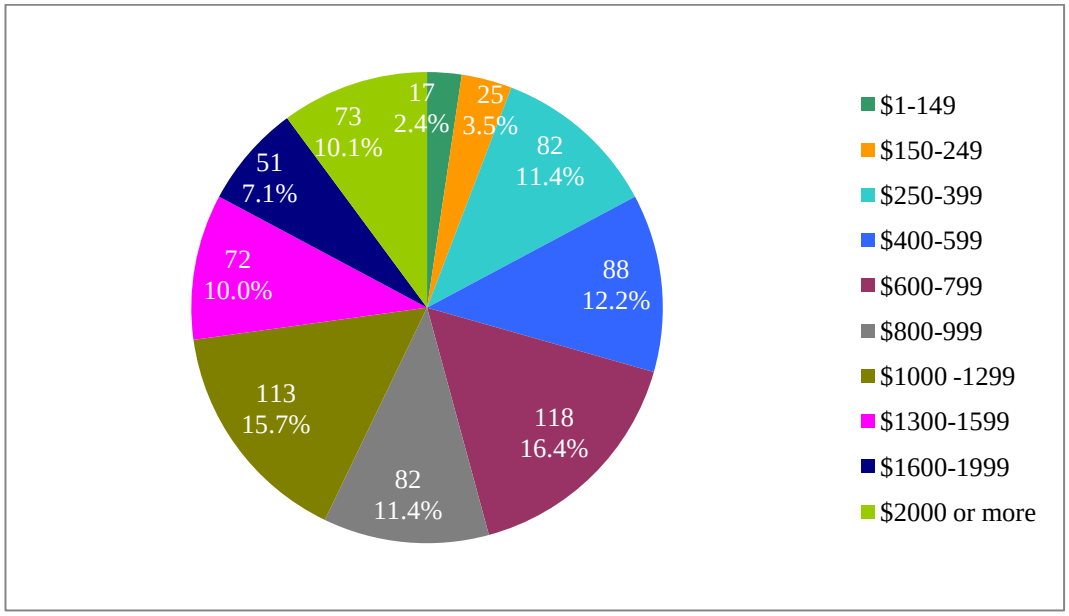


Figure 7.8 Distribution of weekly household income

The original data were collapsed into the following four categories based on similar frequencies: up to $600 weekly accounting for 29.4%, $600-999 (27.7%), $1000-1599 (25.7%), and above $1600 which accounted for 17.2%.

7.4.1.4 Education level

Education level is a component of socio-economic status. Figure 7.9 shows the frequency distribution with the highest secondary school qualification (50.4%) in the group of respondents. There are also 8.6% of missing values for this variable.

For analysis, the responses were collapsed into four groups: non post school qualifications (57.5%), trade or certificate (3.4%), and tertiary qualification (37.5%). A fourth category was not applicable including e.g. children still at school (1.6%).

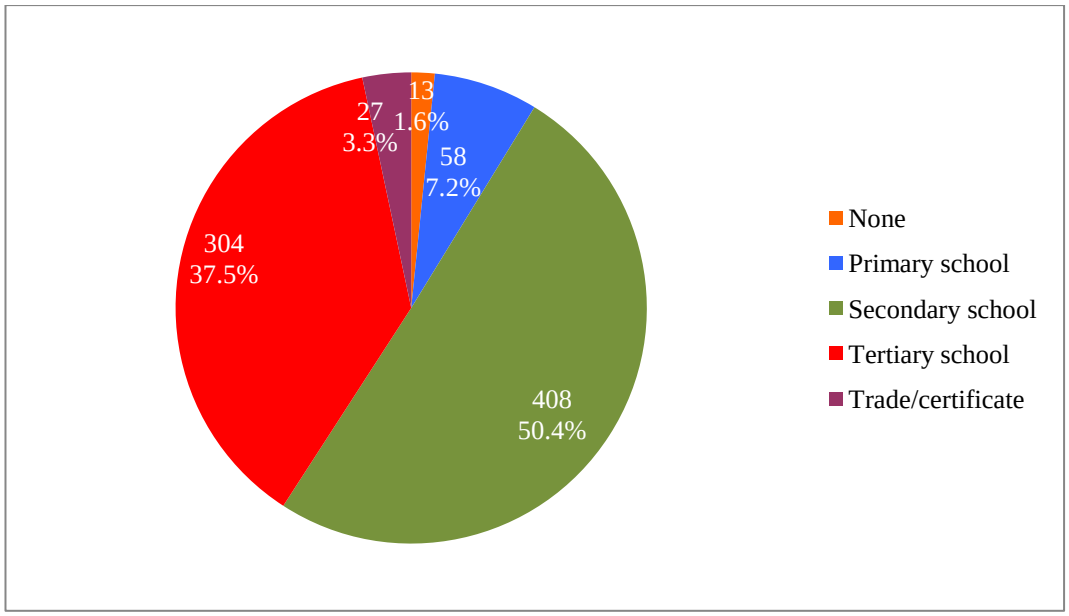


Figure 7.9 Respondents level of education

7.4.1.5 Number of education years completed in Australia

In addition to education level, respondents were asked to provide information related to the number of years of education that they completed in Australia. Figure 7.10 shows the frequency distribution, with the highest percentage of people (42%) completing nine to 12 years of education in Australia. There is also 8.8% of missing data for this variable.

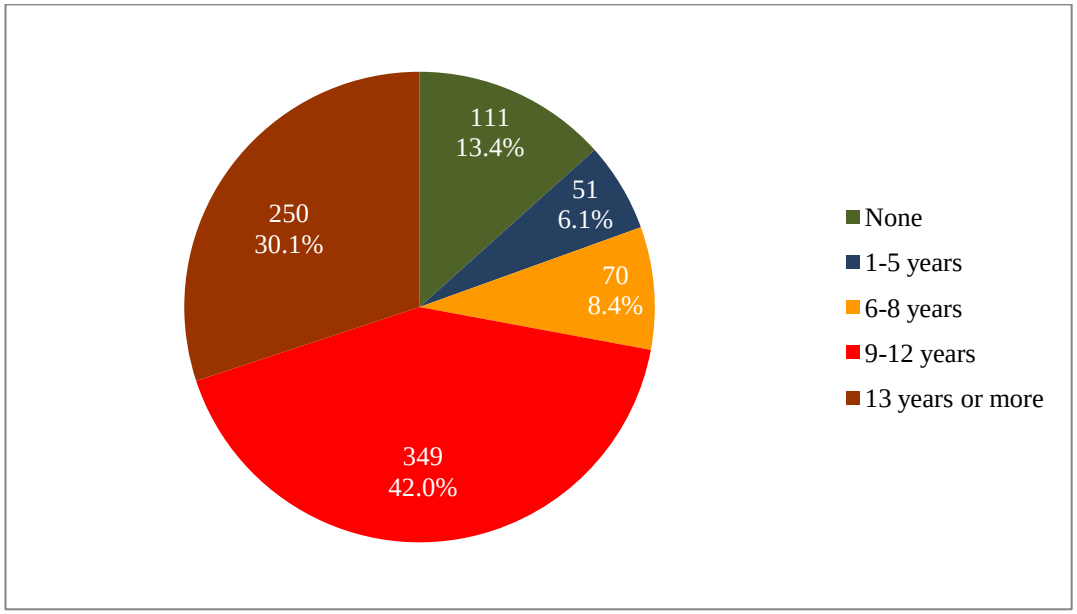


Figure 7.10 Number of years of education in Australia

For analysis purposes, this variable was collapsed into three groups: five or less years which accounted for 19.5%, six to eight years which denoted 8.4%, and nine or more years which represented a majority of 72.1%.

7.4.1.6 Marital status

Respondents were asked about their present marital status and were given seven possible categories to choose from. The highest percentages among respondents indicated that they are presently married (46.7%) followed by never married (16.2%). Figure 7.11 shows the percentage distributions across all categories. There are, however, almost 8% in missing values for this variable.

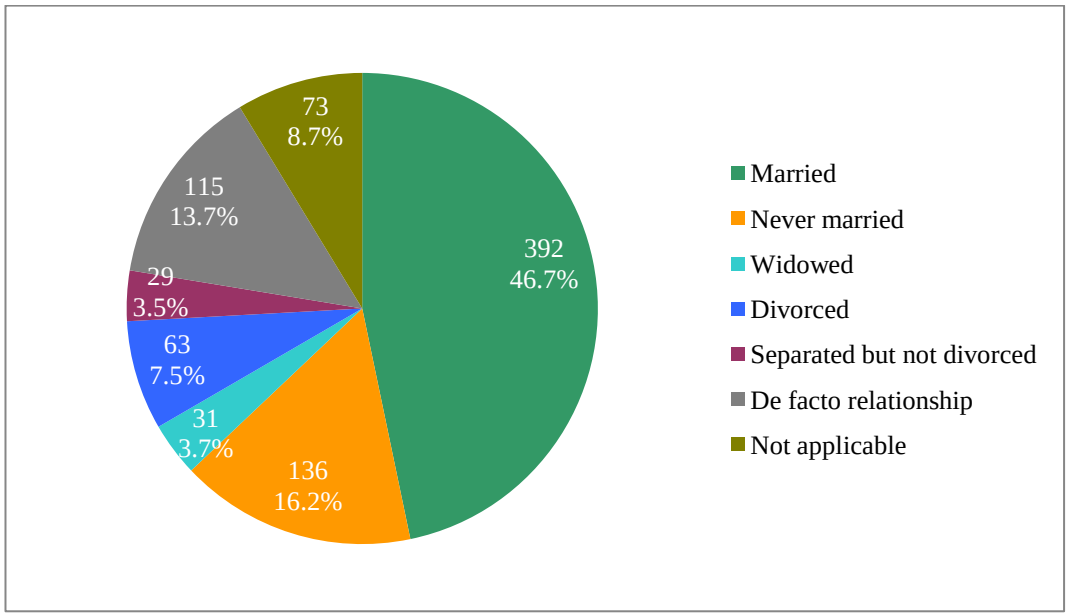


Figure 7.11 Marital status of respondents

The responses were collapsed for further analysis into two categories: "with significant other" including married and de facto relationships (60.4%), and "without significant other" including categories such as: never married, widowed, divorced, separated but not divorced, and not applicable (39.6%).

7.4.1.7 Living arrangements

Respondents were asked to indicate their current living arrangements and were given seven options to choose from. The majority of respondents indicated that they live with somebody with the highest percentage of people (37.5%) living with a spouse or parent with one or more children, or living with a spouse/partner (25%). There were 5.5% of missing values for this variable. Figure 7.12 shows the percentage distribution across all categories.

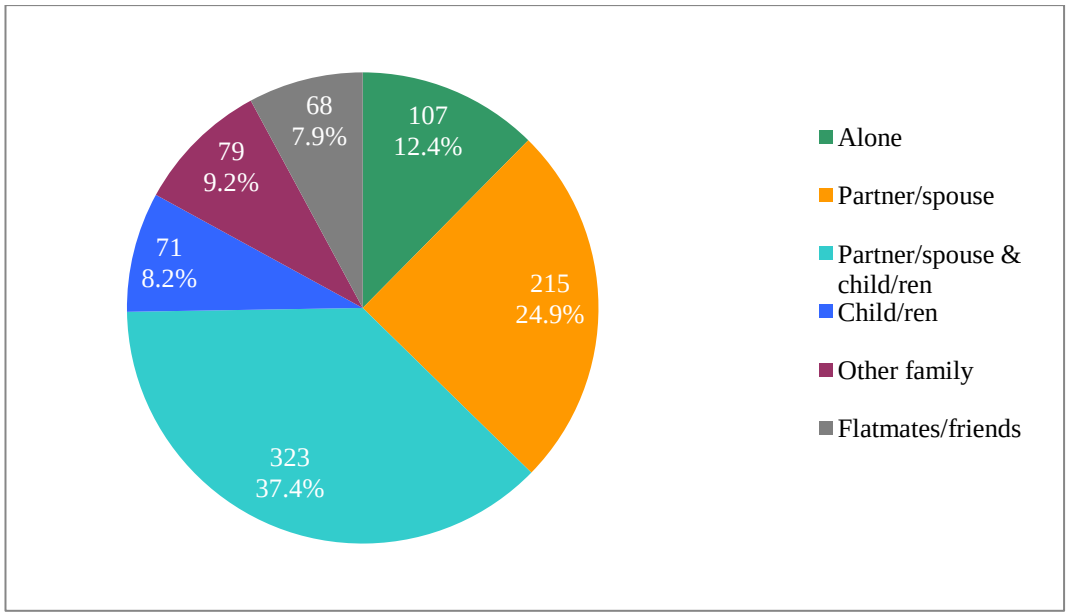


Figure 7.12 Living arrangements among respondents

This variable was then reorganised into two categories: "living with somebody" (87.6%) and "living alone" (12.4%).

7.4.1.8 Ethnicity

The cultural background of patients was also examined and taken into consideration in the further analysis. There were three variables measuring a person's ethnicity: country of birth, language proficiency, and Indigenous status. 78.7% respondents were born in Australia and 21.3% were born overseas. There was 5% of missing data for this variable. 91.7% respondents stated that English was their native language and a further 6.6% indicated that they have no problems with communication in English. This variable was then collapsed into two categories: "no problems with communication" (92.3%) and "problematic communication" (1.7%). There was 6% of missing data.

Respondents were able to choose from four categories to indicate their Indigenous status. The majority (95%) stated they were not Indigenous, 3.8% chose Aboriginal, 0.5% indicated Torres Strait Islanders, and 0.7% nominated themselves both as Aboriginal and Torres Strait Islanders. The last three categories were then collapsed into one Indigenous group (5%), and in the analysis were compared to "no Indigenous group" (95%). There was 7% of missing data for this question.

In addition to the above variables, the respondents who were not born in Australia were asked to provide information about the number of years they had been living permanently in Australia. The continuous variable was then collapsed into three categories: short (zero to two years), medium (three to ten years), and long (11 and more years) stay. The vast majority of people (62.3%) were living long-term in Australia, with 26.7% living between three to ten years and 11% living two or less years.

7.4.1.9 Employment status

Over one third of respondents (35.8%) indicated that they were employed full-time and 18.9% of respondents were employed part-time. Figure 7.13 shows the percentage distribution of respondents' employment status.

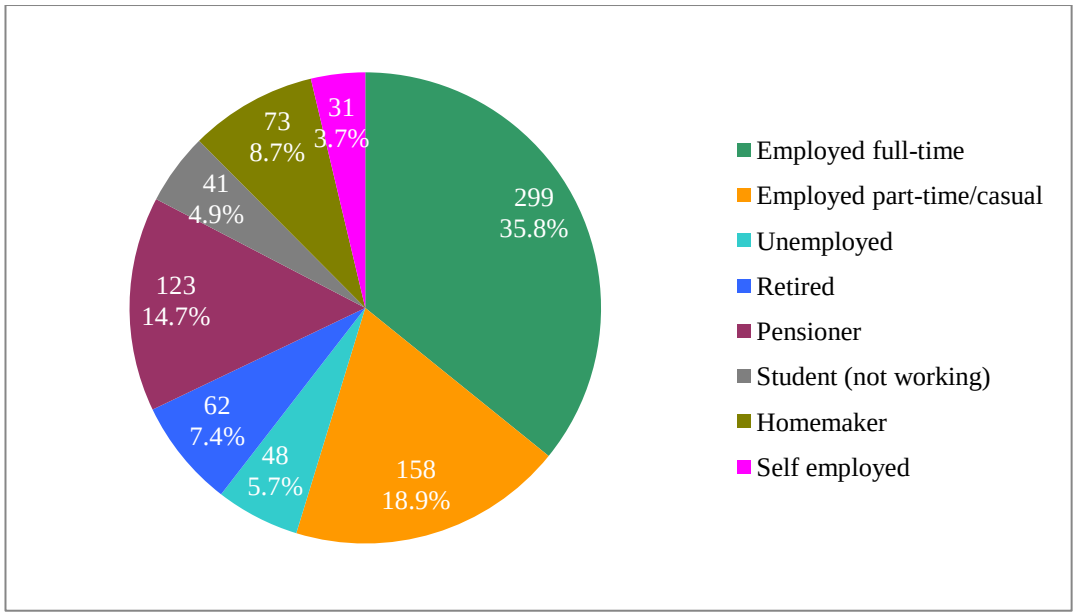


Figure 7.13 Employment status of respondents

This variable was subsequently regrouped into two categories: "in work forces" (including full-time, part time, self employment) and accounting for 58.4%, and a second group "not in work forces" (including homemaker, student, pensioner, retired, unemployed) and accounting for 41.6%.

7.4.1.10 Survey type

There were two groups of respondents: adult patients who completed the questionnaire in relation to their current condition and presentation, and another group which consisted of parent or guardians of children who completed questionnaires on their behalf. Among the 911 questionnaires collected, 687 were

completed by adults (75.4%) and 224 by parents/guardians (24.6%). The survey type was used in the analysis as one of the variables to examine any potential differences between the two groups of participants.

7.4.2 Moderating variables

A number of variables were derived from the survey as potential moderating variables and were used in further analysis. The details regarding each variable are presented below.

7.4.2.1 Contact and suggestion made by someone prior to coming

Respondents were asked to indicate if they contacted anybody about their condition before coming to the emergency department and if anybody made such a suggestion. There were two questions with the possibility of multiple responses. These two variables were further dichotomised into two categories each utilising algorithms available in SPSS. The categories created were: no contact made (41.2%) versus contacted someone (58.8%); and no suggestion made (21.6%) versus someone suggested (78.4%). Figure 7.14 presents the distribution of results.

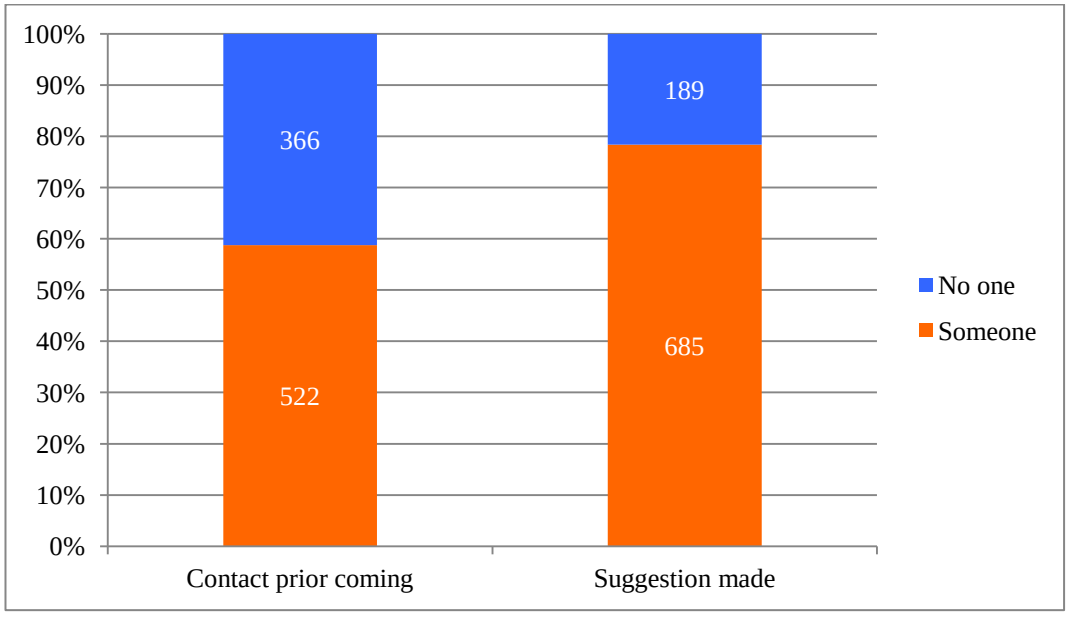


Figure 7.14 Contact and suggestion made before attending the emergency department

7.4.2.2 Perceived general health status

General health status as perceived by the respondents was measured using three variables: commencement of the current medical problem, perceived overall health status, and existence of other health conditions. Figure 7.15 and Figure 7.16 shows

the percentage distribution for commencement of the presenting problem and perceived overall health status.

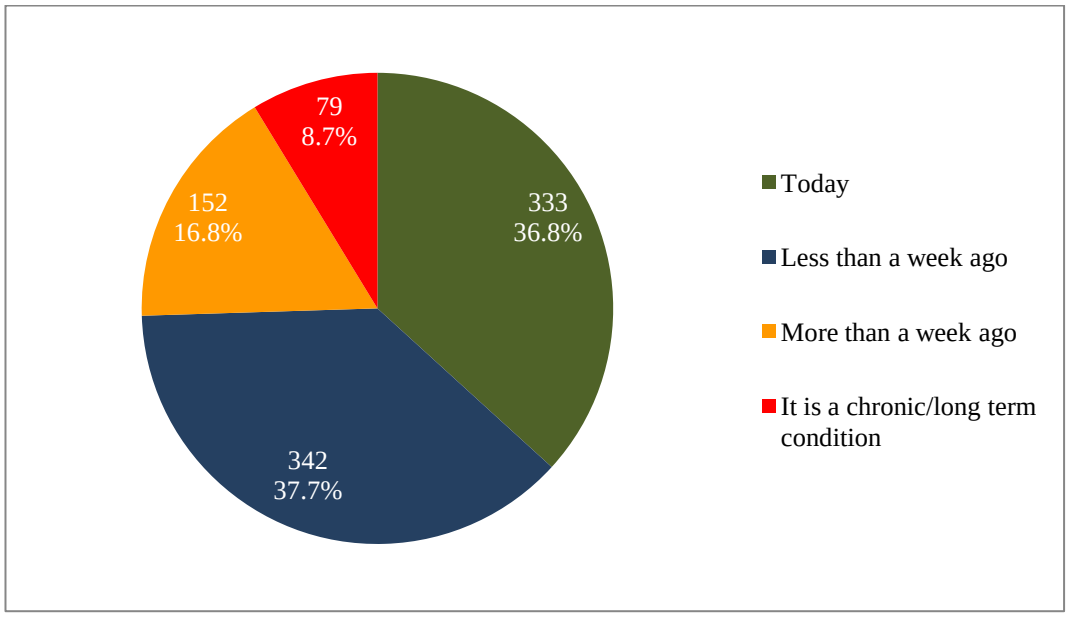


Figure 7.15 Commencement of the presenting condition

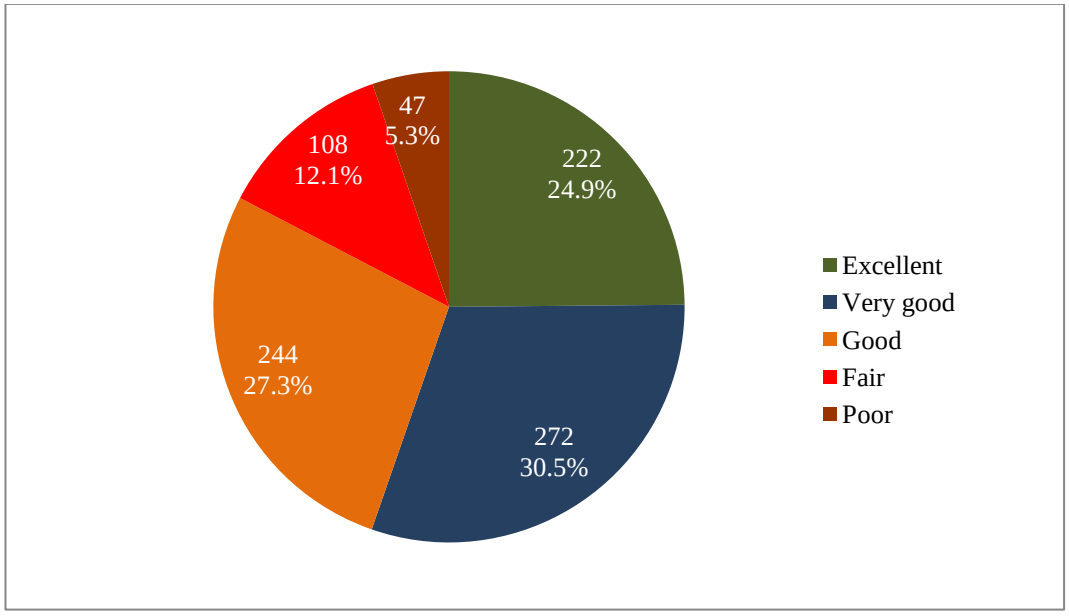


Figure 7.16 Perceived overall health status

The variable relating to the commencement of the presenting problem was subsumed into two categories: new condition (which accounted for 36.8%) and existing condition (accounting for 63.2%). The overall health status variable was treated in further analysis as an ordinary variable with a range from excellent to poor health as in the original question. The respondents also answered a question of other existing

conditions with 31.3% admitting that they have additional medical problems and 68.7% not reporting any known conditions.

7.4.2.3 Patients' perceived priority

Patients were asked to indicate the urgency of their own presenting problem by selecting the time period within which they should be seen. Figure 7.17 presents the distribution of answers.

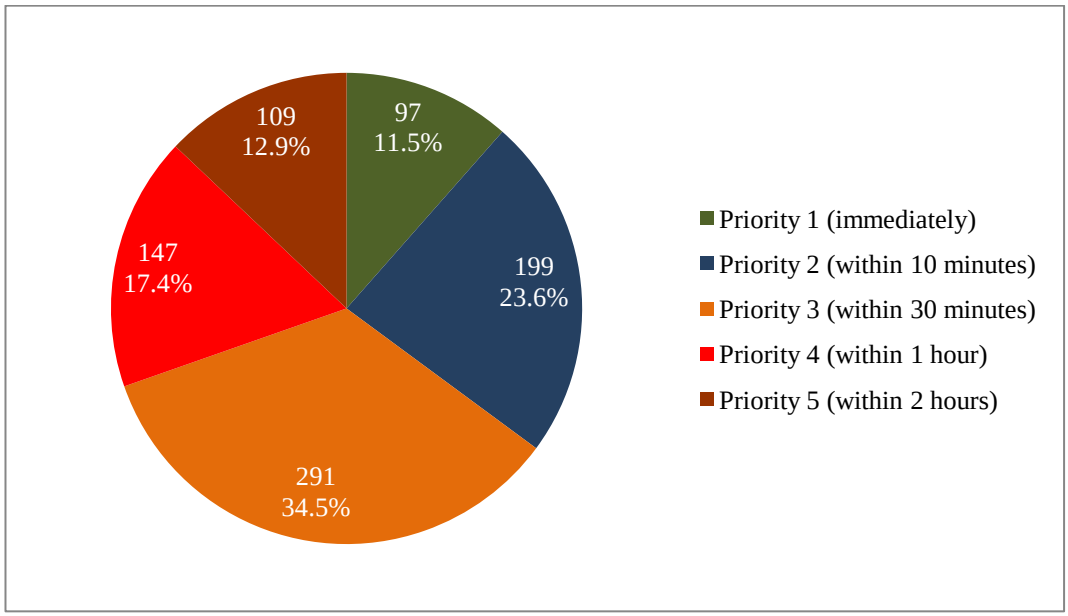


Figure 7.17 Perception of priority by respondents

The perception of patients' own priority was treated in further analysis as an ordinary variable within the original categories as presented above.

7.4.2.4 Place where decision was made

Patients were asked to specify where they were when they made the decision to come to the emergency department.

Figure 7.18 shows the distribution of patients' answers, with the highest percentage (60.7%) of people making the decision from home.

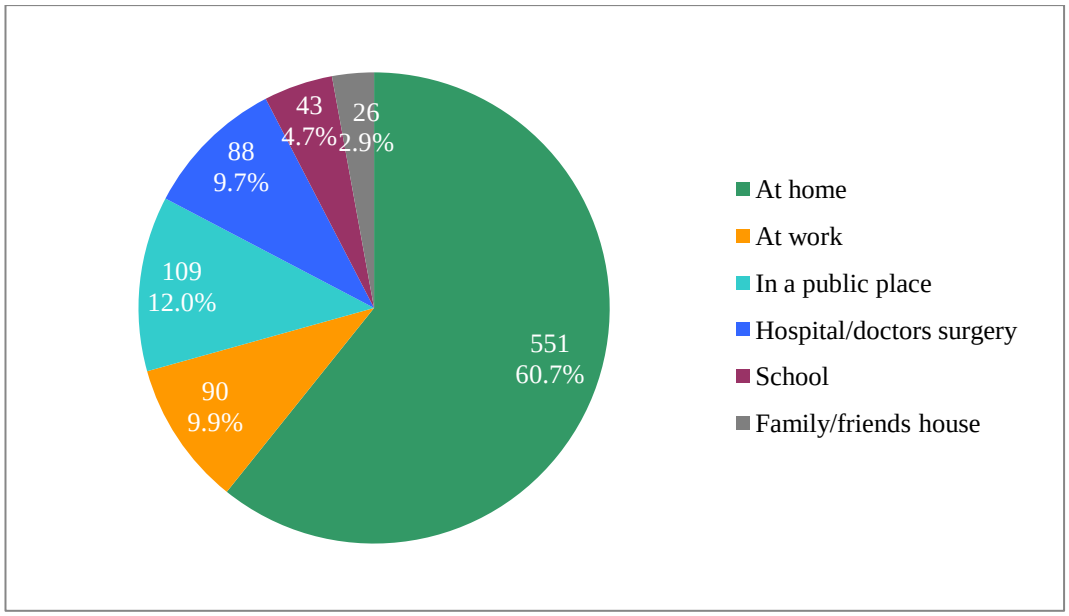


Figure 7.18 Place where decision was made

Further, this variable was changed into two categories: decision made from home (60.7%) and decision made away from home (39.3%).

7.4.2.5 Patients' arrival with or without an accompanying person

Item number four on the questionnaire examined if patients arrived at emergency departments accompanied by any other persons. The majority of people came with a family member or a friend (61.1%) as shown on Figure 7.19.

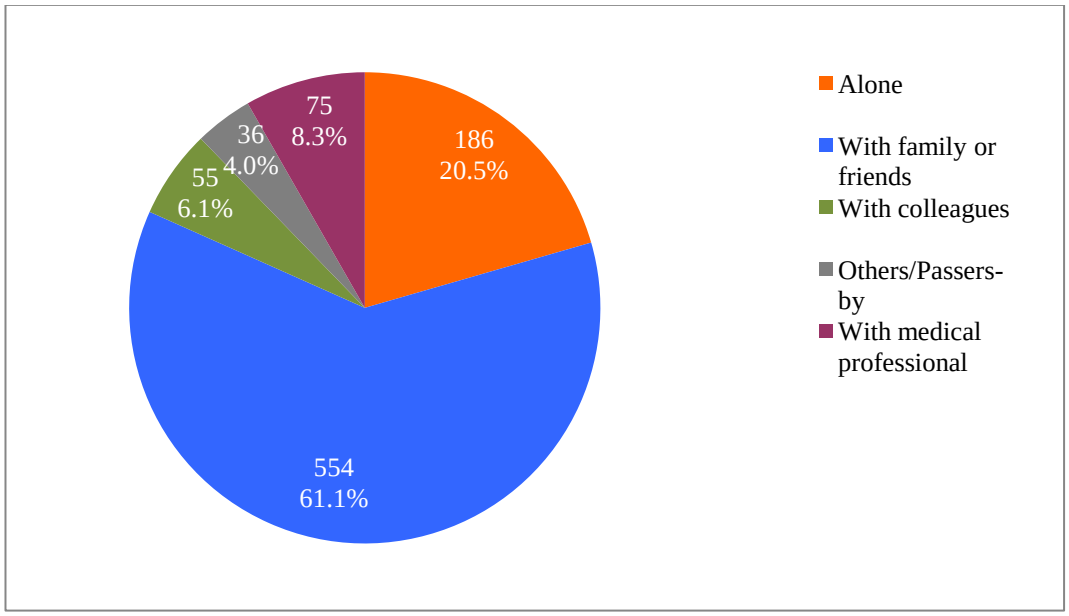


Figure 7.19 Arrival with or without an accompanying person

This variable was collapsed into two categories for subsequent analyses: accompanied by someone (79.5%) and arrived on his/her own (20.5%).

7.4.2.6 Insurance status

The respondents were asked to indicate if they are (in addition to Medicare) covered by any other health insurance funds. Figure 7.20 presents the allocation of answers.

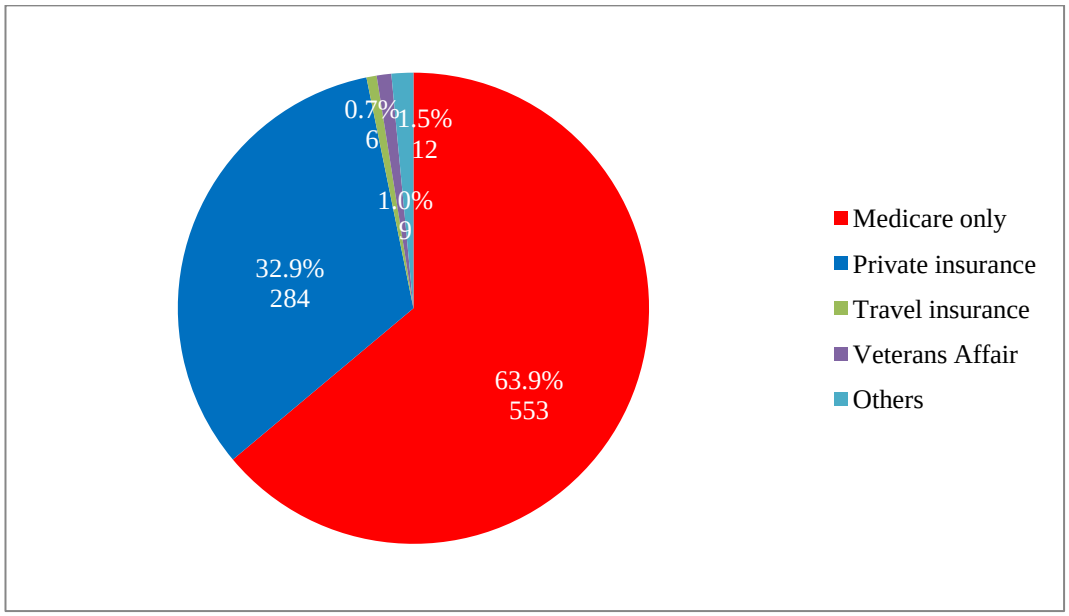


Figure 7.20 Insurance status

This variable was further collapsed into two categories: Medicare only (which accounted for 63.9%) and other insurances (accounting for 36.1%).

7.4.2.7 Availability of other health or GP services

As mentioned in section 5.4.7.1, the Factor Analysis conducted in question 18 extracted only one item (component 3) which referred to the availability of other health services or GPs and which thus explained the 10% of the variance. This variable was then used as a separate measure of availability for other health or GP services. The majority of patients indicated that they did not consider the lack of other health services a reason to come to the emergency department. Figure 7.21 presents the distribution of all answers.

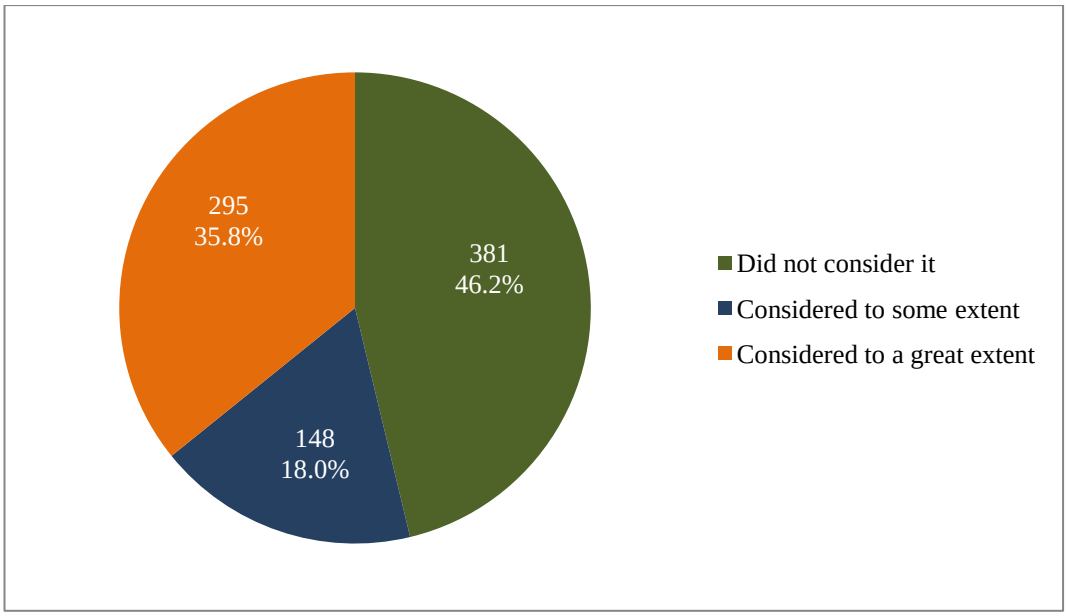


Figure 7.21 Availability of other health or GP services

This variable was treated in further analysis as a categorical variable with the original categories as presented above.

7.4.3 Outcome variables

For the purpose of this study, three outcome variables were identified as measures of patients' utilisation of emergency department services as described by the theoretical model developed and explained in Chapter 4. The details regarding each variable are presented below.

7.4.3.1 Frequency of use

Patients were asked to indicate how many times in the past six months they presented themselves to emergency departments. Figure 7.22 illustrates the distribution of the number of patients' visits to emergency departments. There was 2.1% of missing data for this variable.

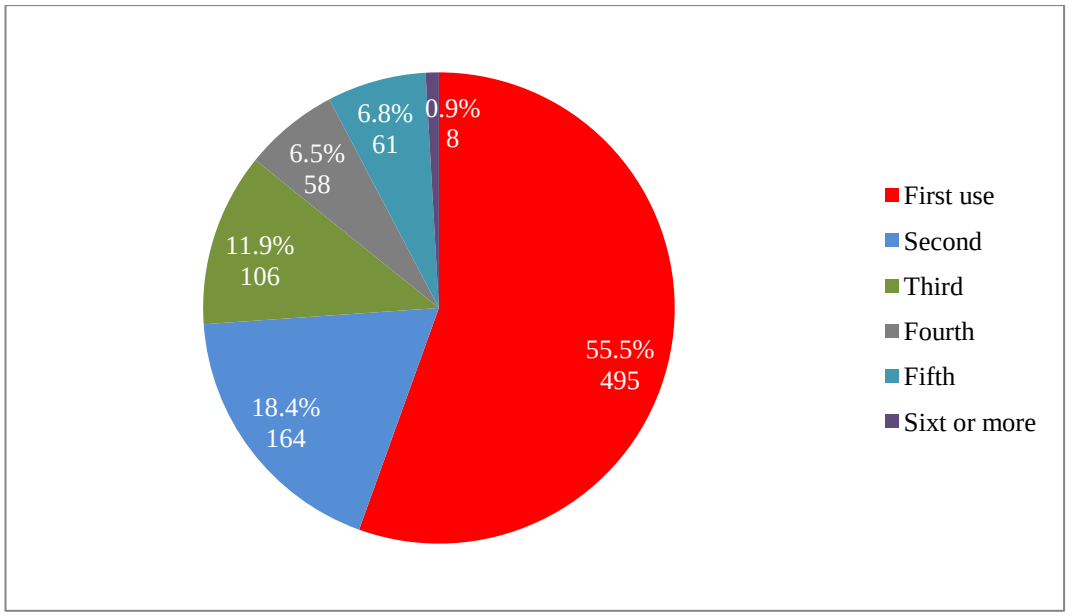


Figure 7.22 Frequency of emergency department presentations

This variable was used for further analysis and grouped into two categories: patients who used emergency departments for the first time in the past six months (which accounted for 55.5%) and patients who presented themselves more than once (multiple users which accounted for 44.5%).

Table 7.14 Gender and age of participants and their frequency of use of emergency departments

	First time users		**Multiple users**		**Total (N)**
	N	%	N	%	
Male	234	49.1	168	43.8	402
Female	243	50.9	216	56.2	459
15-24	59	12.6	71	18.8	130
25-34	109	23.3	97	25.7	206
35-44	107	22.9	76	20.1	183
45-54	82	17.5	41	10.8	123
55-64	40	8.5	32	8.5	72
65-74	39	8.3	31	8.2	70
75-84	23	4.9	18	4.8	41
85 and over	9	1.9	12	3.2	21

Table 7.14 presents the demographic characteristics of first time and multiple users of emergency departments. For both groups, females were in the majority and participants below 34 and above 85 years old accounted for higher proportions of multiple users of emergency departments.

7.4.3.2 Mode of transport

The respondents were asked by what mode of transport they arrived to the emergency department. Figure 7.23 presents the distribution of answers with the

majority (43%) of people arriving by their own car. There was 5.4% missing data for this variable.

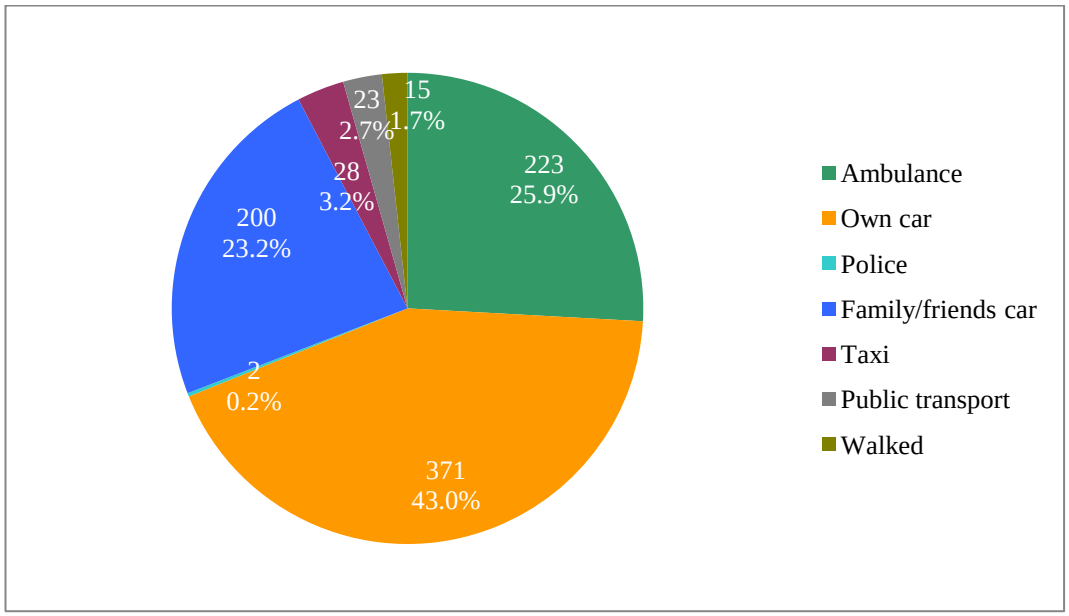


Figure 7.23 Distribution of mode of transport

For the purpose of analysis, this variable was collapsed into two categories: arrived by ambulance and arrived by other means of transport which accounted for 25.9% and 74.1% respectively.

Table 7.15 Gender and age of participants and their mode of transport to emergency departments

	Ambulance users		**Other transport users**		**Total (N)**
	N	%	N	%	
Male	109	49.3	287	45.3	396
Female	112	50.7	347	54.7	459
15-24	24	11.2	106	17.0	130
25-34	31	14.4	175	28.0	206
35-44	40	18.6	142	22.7	182
45-54	28	13.0	93	14.9	121
55-64	28	13.0	44	7.0	72
65-74	34	15.8	35	5.6	69
75-84	16	7.4	22	3.5	38
85 and over	14	6.6	8	1.3	22

Table 7.15 presents the demographic characteristics of ambulance users and participants who used their own transport to come the emergency departments. Females were in the majority for both groups of respondents. Two differences can be noted, as younger participants (below 54 years old) tend to use their own transport as opposed to older groups of participants (55 years old and above) who more often used ambulance as a mode of transport.

7.4.3.3 Decision maker

The respondents were asked to indicate if they made a decision to come to emergency departments by themselves or somebody else made this decision for them. There was 3.8% of missing data for this variable. Figure 7.24 presents the distribution of all decision makers selected by respondents.

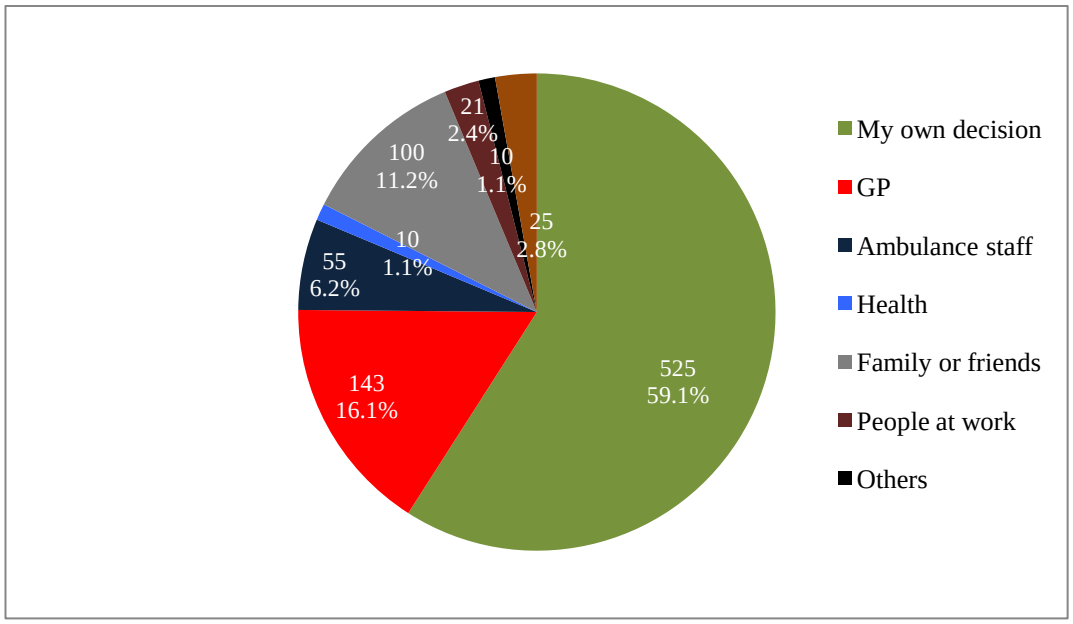


Figure 7.24 Distribution of decision makers

In the parent/guardian version of the questionnaire, there was an additional category in the response format to allow for the distinction between a patients' own decision and a decision made by a parent/guardian. There were only 11 responses indicating that a patient (child) made a decision of their own accord, as opposed to 123 parents/guardians who made a decision on behalf of their child. Therefore, these two categories were collapsed together and this variable was dichotomised into two categories which were used in further analysis: a participant's own decision and somebody's else decision which accounted for 59.1% and 40.9% respectively.

Table 7.16 Gender and age of participants and decision maker variable

	Participant's own decision		**Decision made by others**		**Total (N)**
	N	%	N	%	
Male	236	46.5	165	47	401
Female	272	53.5	186	53	458
15-24	77	15.4	52	15.1	129
25-34	126	25.3	79	23.0	205
35-44	111	22.2	71	20.6	182
45-54	79	15.8	44	12.8	123
55-64	47	9.4	24	7.0	71
65-74	36	7.2	35	10.2	71
75-84	15	3.1	25	7.2	40
85 and over	8	1.6	14	4.1	22

Table 7.16 presents the demographic characteristics of participants who made their own decision and those for whom that decision was made. Females were in the majority for both groups of respondents. The younger participants (below 64 years old) were more likely to make their own decision to seek care through the emergency department services. Other people more often made that decision for older participants (64 years old and above).

7.5 SUMMARY

In summary, this chapter examined the representation of the study sample and presented the demographic profile of the participants and patients. The results showed a satisfactory representation according to gender and age of the participants in the sample. The response rate achieved was satisfactory, with 67% of questionnaires returned. Further comparisons suggested that data from the study sample together with EDIS data were not very divergent. The second part of this chapter discussed distributions of answers to individual questions and explained how these variables were transposed and are to be used in subsequent bivariate and multivariate analyses in Chapter 8.

Chapter 8: Results Study two: Perspectives of patients and their reasons for using emergency department services

8.1 INTRODUCTION

Chapter 8 presents the results from Study two and examines the second PhD objective, which tries to explain patients' reasons for seeking care through the emergency department services, as outlined in Chapter 1. This section undertakes a number of bivariate analyses followed by multivariable analysis to examine and understand the relationship between patients' reasons and perspectives and the use of emergency department services.

8.2 RESULTS OF DATA ANALYSIS

This section contains the analyses of data which were performed and are presented in the following order for each of the three dependant variables. Bivariate relationships between the independent and moderating variables on each of the dependent variables were tested with Mann - Whitney *U* tests for ordinary variables, Chi-squared tests for nominal variables, and independent t-tests for continuous variables. The null hypothesis in Mann - Whitney *U* tests assumed that mean ranks in two groups of predicting variables were the same. The independent t-tests were performed with the null hypothesis assumption that means in two groups of predicting variables were the same. Statistical significance was determined at $p<0.05$ for all tests. Additionally for Chi-square tests, Cramer's V correlation coefficient is reported as a measure of the strength of relationship between two variables. Values below 0.3 indicated a weak relationship, between 0.3 and 0.5 a moderate, between 0.5 and 0.8 a strong relationship and above 0.8 a very strong relationship between the two variables (Corder & Foreman, 2009). Multivariable logistic regression models were calculated to determine the relationship between the use of emergency departments and predictors, as this study has three binary outcome variables and a mixture of continuous and categorical predictor variables. The data was checked for

its fit with the assumptions of logistic regression. There was adequacy of expected frequencies and there was independence in responses of different cases (Field, 2013). All variables significantly associated with the use of emergency departments ($p<0.05$ level) from the previous bivariate analyses were simultaneously entered into a multivariable logistic regression model (Stepwise method with Forward, Likelihood ratio) to examine their independent effect on the use of emergency departments. Since neither age nor gender were found to be significant, the model was not controlled for any of these variables. A significance test, the parameters, and the odds ratio were calculated for the predictor variables to determine the degree of influence each independent variable had on the outcome variable. These are discussed in the sections below.

8.3 FREQUENCY OF EMERGENCY DEPARTMENT USE

8.3.1 Results of Mann-Whitney *U* tests

The Mann - Whitney *U* tests were performed between nine predicting variables and the frequency of emergency department use outcome variable, which was defined on two levels: first time and multiple users of emergency departments. Table 8.1 shows the results of all tests conducted. Tests that showed statistical significance are marked in bold.

Table 8.1 Results of the Mann - Whitney *U* tests

	First time users	Multiple Users	Mann-Whitney	P value
	Mean rank		(000)	
Commencement of health problem	**399.1**	**501.1**	**74.9**	**< 0.001**
Perceived overall health status	**495.6**	**379.4**	**71.6**	**< 0.001**
Patients' perceived priority	412.1	430.9	83.1	0.249
Availability of other health or GP services	**458.5**	**395.6**	**77.9**	**< 0.001**
Length of stay in Australia	93.7	97.8	4.26	0.557
English fluency	**433.3**	**417.0**	**86.1**	**0.043**
Education level	412.3	390.0	75.1	0.121
Education in Australia	419.9	404.2	80.8	0.231
Income	**389.9**	**320.3**	**51.2**	**< 0.001**

In five out of nine tests the null hypothesis was rejected, as the differences in mean ranks were significantly different. The details of these five tests are discussed separately below.

8.3.1.1 Analysis of relationship between the commencement of a health problem and frequency of emergency department use variable

First time users of emergency departments (*mean rank=399.1*) differ significantly from the group of multiple users (*mean rank=501.1*); U = 74 996.500; Z = -6.24; p < 0.001. Figure 8.1 presents the distribution of answers in these two groups which shows that first time users more often (42.6%) come to emergency departments if the problem commenced on the day as compared to multiple users (28.9%). Almost 10% more of multiple users were seeking care in emergency departments if their health problem was of a chronic nature than first time users.

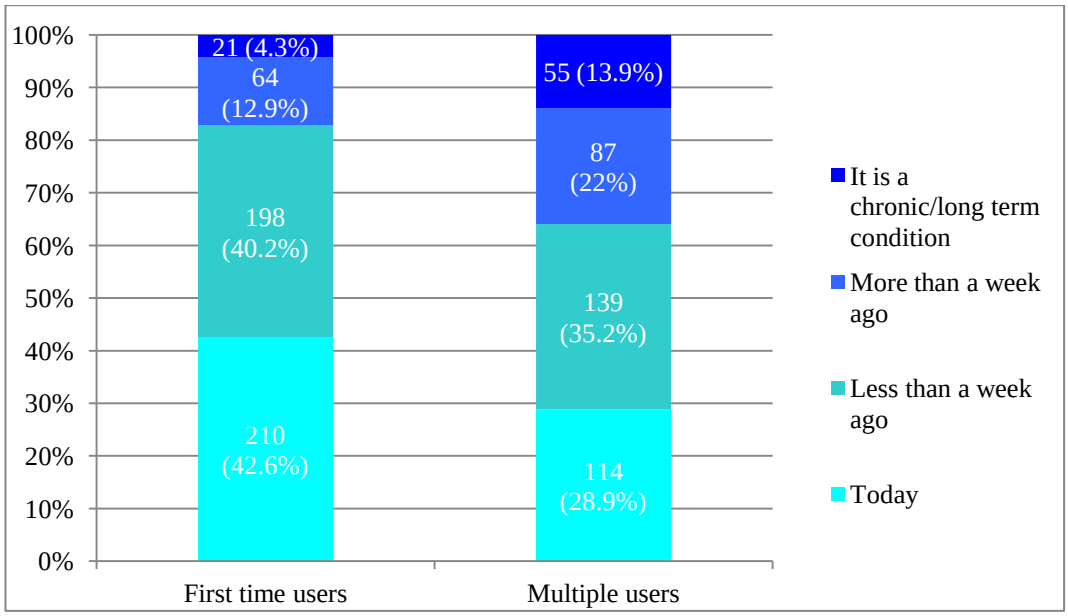


Figure 8.1 Commencement of presenting health problem and frequency of use variable

8.3.1.2 Analysis of relationship between the overall health status and frequency of emergency department use variable

First time users of emergency departments (*mean rank=495.6*) differ significantly from the group of multiple users (*mean rank=379.4*); U = 71 677.000; Z = -6.59; p < 0.001.

Figure 8.2 presents the distribution of answers in these two groups, which shows clearly that people who came to the emergency department for the first time in the past six months more often perceived their health status as excellent or very good (65.2%) in comparison to multiple users (43.4%). Among the respondents who reported their health status as poor or fair, a higher percentage (26%) made multiple visits to emergency departments as opposed to a mere 10% among first time users.

Interestingly, over 55% of all users of emergency departments were satisfied with their overall health status reporting excellent or very good health.

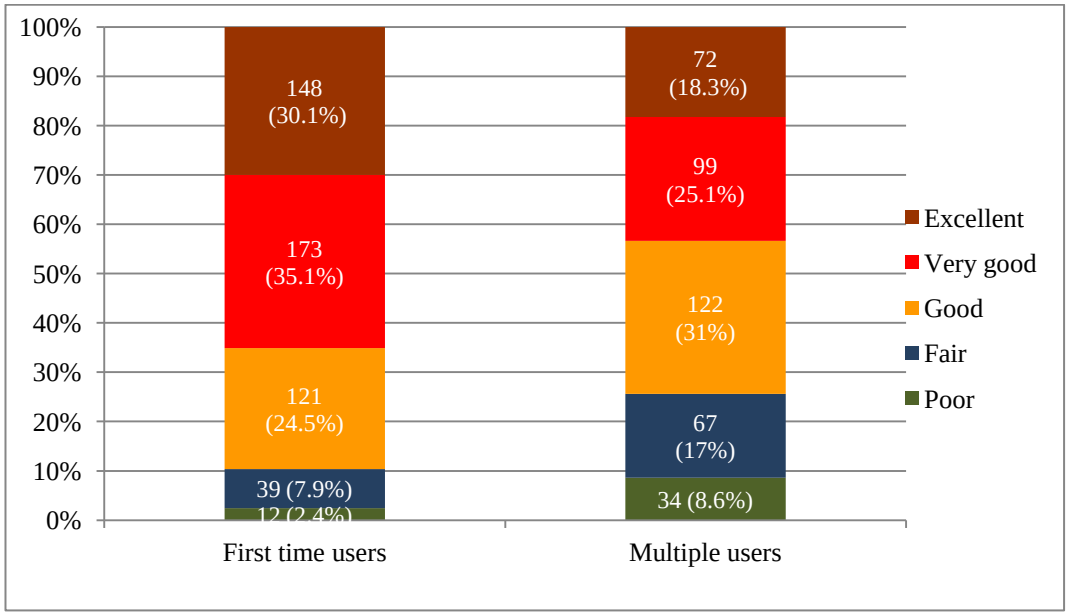


Figure 8.2 Perceived own health status and frequency of use variable

8.3.1.3 Analysis of relationship between availability of other health or GP services and frequency of emergency department use variable

First time users of emergency departments (*mean rank=458.5*) differ significantly from multiple users (*mean rank=395.6*); U = 77 990.500; Z = -4.44; p < 0.001.

Figure 8.3 demonstrates that first time users (48%) more often than multiple users (44%) did not consider the availability of other health services as important but sought care directly from emergency departments. Multiple users (56%) as opposed to 52% of first time users, considered to a greater or lesser extent services potentially available elsewhere but decided to seek medical care through the emergency department services.

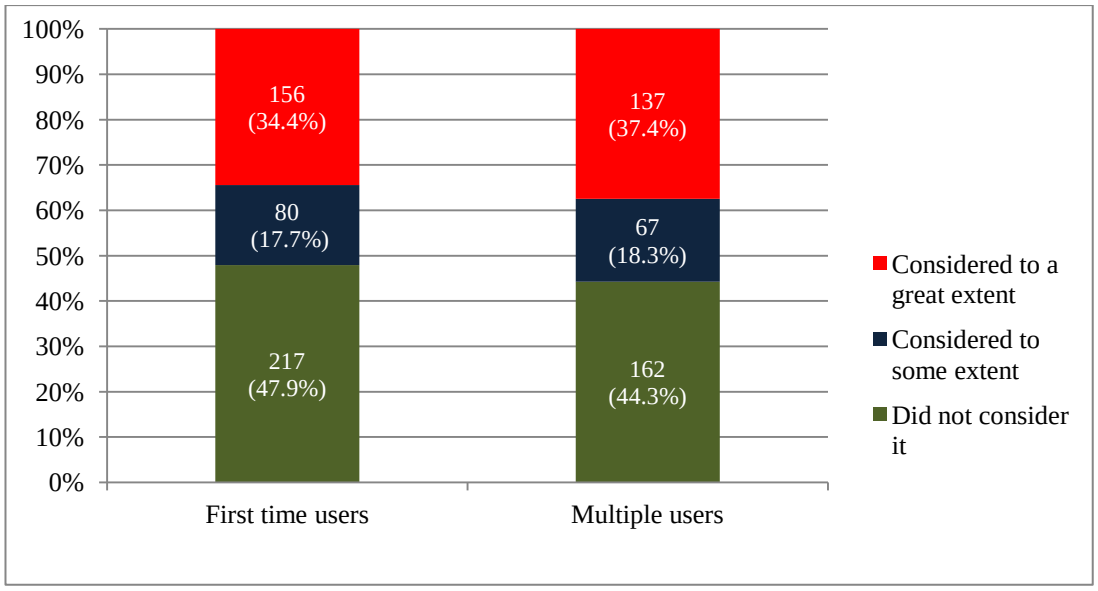


Figure 8.3 Availability of other health or GP services and frequency of use variable

8.3.1.4 Analysis of relationship between English fluency and frequency of emergency department use variable

First time users of emergency departments (*mean rank=433.3*) differ significantly from the group of multiple users (*mean rank=417.0*); U = 86 104,500; Z = -2,02; $p < 0.05$. A large majority of patients (92%) who present to the emergency departments for the first time were native speakers, however the first time users more often than multiple users indicated that English was their mother tongue (94% and 90% respectively) as presented on Figure 8.4. Participants who return to hospital for care frequently have problems with communication or do not speak English at all as compared to the first time users (6% versus 3%).

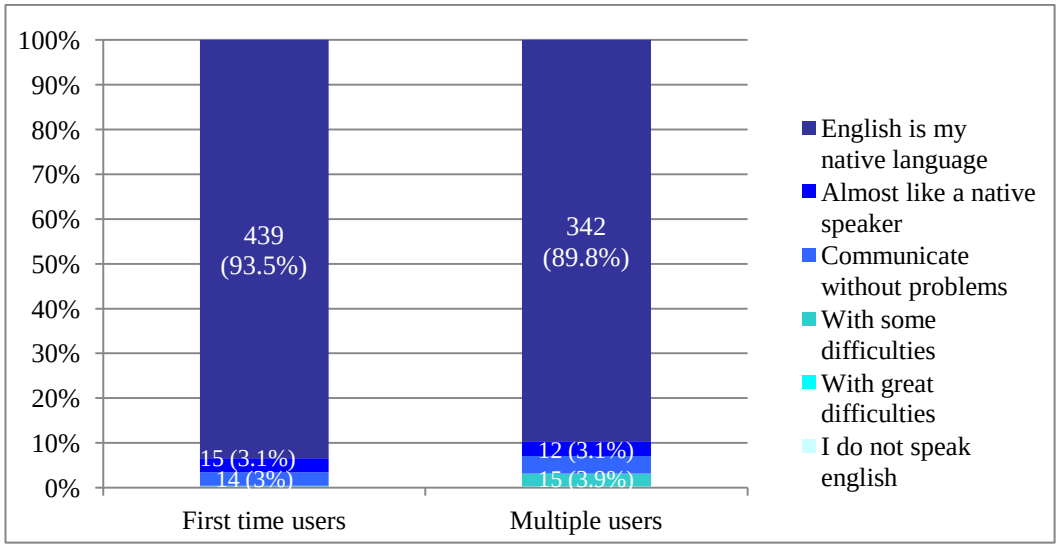


Figure 8.4 English fluency and frequency of use variable

8.3.1.5 Analysis of relationship between level of patient's income and frequency of emergency department use variable

First time users of emergency departments (*mean rank=389.9*) differ significantly from multiple users (*mean rank=320.3*); U = 51 161.000; Z = -4.63; p < 0.001. The largest group, accounting for approximately 30% of participants, reported their total household weekly income as below $600. Figure 8.5 presents the relationships between patients' weekly income and the frequency of use of emergency departments and shows that patients with a weekly income below $1000 often presented and returned to emergency departments compared to first time users.

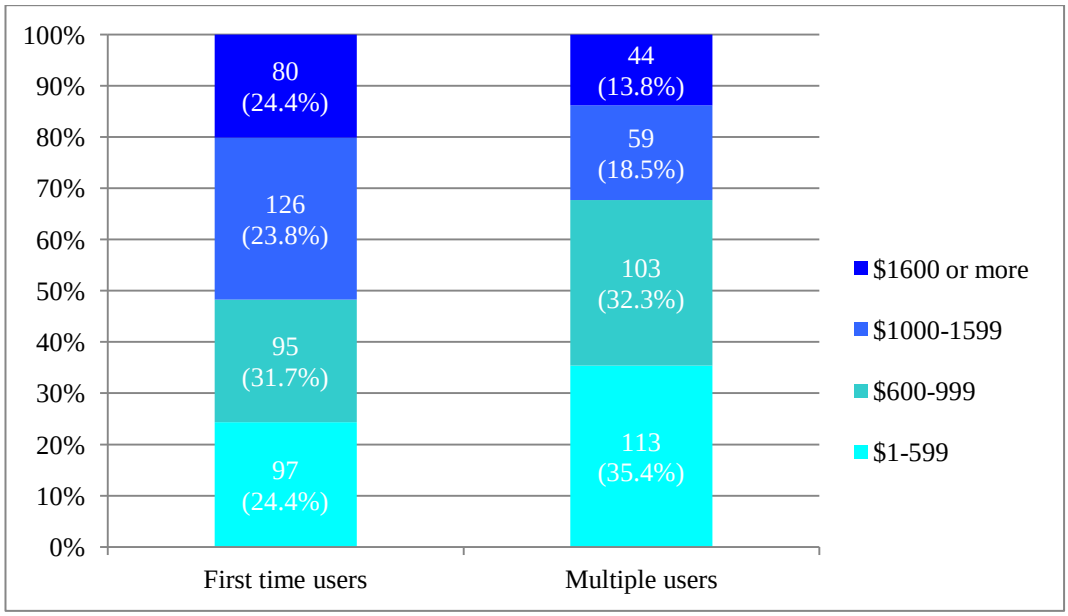


Figure 8.5 Patient's weekly income and frequency of use variable

8.3.1.6 Summary of findings from Mann-Whitney *U* tests

The findings from the above bivariate analyses underline significant characteristics of the two groups of emergency department users as summarised in Table 8.2.

Table 8.2 Summary of characteristics based on Mann-Whitney *U* tests for frequency of use variable

First time users more likely:	*Multiple users more likely:*
• were in a good health; • presented with recently developed health problem; • more often sought care from emergency departments in the first instance; • spoke English fluently; • were higher income earners.	• were more sick in their own opinion; • had a long term or chronic illness; • considered seeking help elsewhere; • had problems communicating in English; • were low income earners.

8.3.2 Results of Pearson's Chi-square tests

Pearson's Chi-square tests were performed on 13 predicting variables and the frequency of emergency department use outcome variable. This was defined on two levels: first, and multiple users of emergency departments. Table 8.3 shows results of all tests performed. Tests that showed statistical significance are marked in bold.

Table 8.3 Summary of Chi-square tests

	χ^2	P value	V Cramer	C Pearson
Place where decision was made	**20.7**	**< 0.001**	**0.152**	**0.151**
Arrival with or without accompanying person	2.3	0.130	0.051	0.051
Other health conditions	**35.9**	**< 0.001**	**0.201**	**0.197**
Contact prior to coming	0.0	0.971	0.001	0.001
Suggestion made	0.3	0.560	0.020	0.020
Gender	2.4	0.121	0.053	0.053
Living arrangements	0.3	0.604	0.018	0.018
Insurance status	**19.7**	**< 0.001**	**0.151**	**0.150**
Immigrant status	0.0	0.941	0.002	0.002
Marital status	**6.9**	**< 0.001**	**0.091**	**0.091**
Indigenous status	**4.2**	**< 0.001**	**0.070**	**0.070**
Employment status	**18.3**	**< 0.001**	**0.148**	**0.147**
Survey Type	0.42	0.553	0.020	0.020

Six out of 13 tests showed a significant relationship between two variables. The details of these six tests are discussed individually below.

8.3.2.1 Analysis of the relationship between the place where patients made their decision and the frequency of emergency department use variable

There was a significant association between the place where patients made the decision to come to the emergency department and the frequency of use $\chi^2(1) = 20.7$; $p < 0.001$. Cramer's V correlation coefficient of 0.15, indicated a weak relationship between these two variables. The majority of participants (61%) made the decision to present to the hospital from home. Nevertheless, Figure 8.6 shows that first time users more often made the decision to come to the emergency department outside of their residence (46%) compared to multiple users who more often make this decision at their homes (69%).

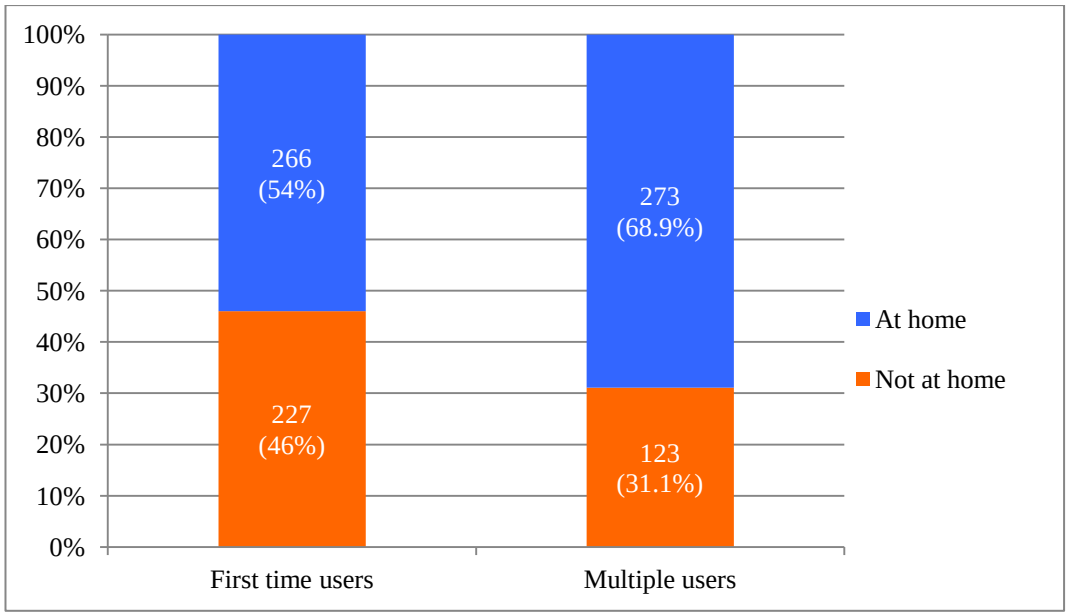


Figure 8.6 Place where decision was made and frequency of use variable

8.3.2.2 Analysis of the relationship between patients' other health conditions and the frequency of emergency department use variable

There was a significant association between other health conditions reported by patients and the frequency of use $\chi^2(1) = 35.9$; $p < 0.001$. Cramer's V correlation coefficient of 0.20, indicated a weak relationship between these two variables. Almost 80% of first time users and 60% of multiple users did not have additional health conditions. Nevertheless, multiple users (41%) more often presented with the additional conditions as compared to first time users (23%) as indicated in Figure 8.7.

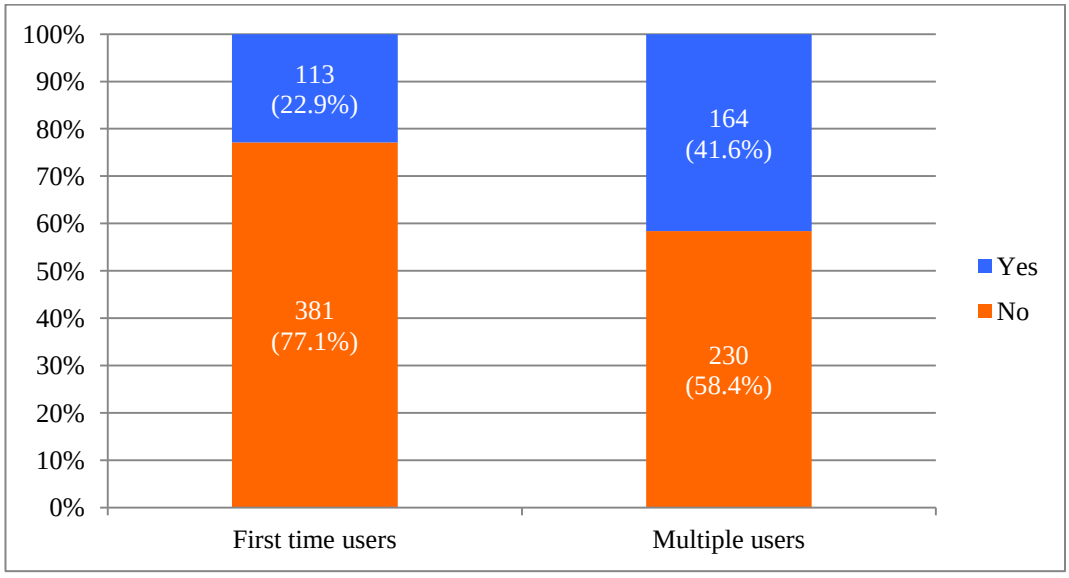


Figure 8.7 Patients' other health conditions and frequency of use variable

8.3.2.3 Analysis of the relationship between patients' insurance status and the frequency of emergency department use variable

There was a significant association between patient's insurance status and the frequency of use $\chi^2(1) = 19.7$; $p < 0.001$. Cramer's V correlation coefficient of 0.15, indicated a weak relationship between these two variables. Sixty four percent of participants reported having only Medicare as presented in Figure 8.8, although 72% of multiple users reported a lack of additional health cover in comparison to 57% of first time users.

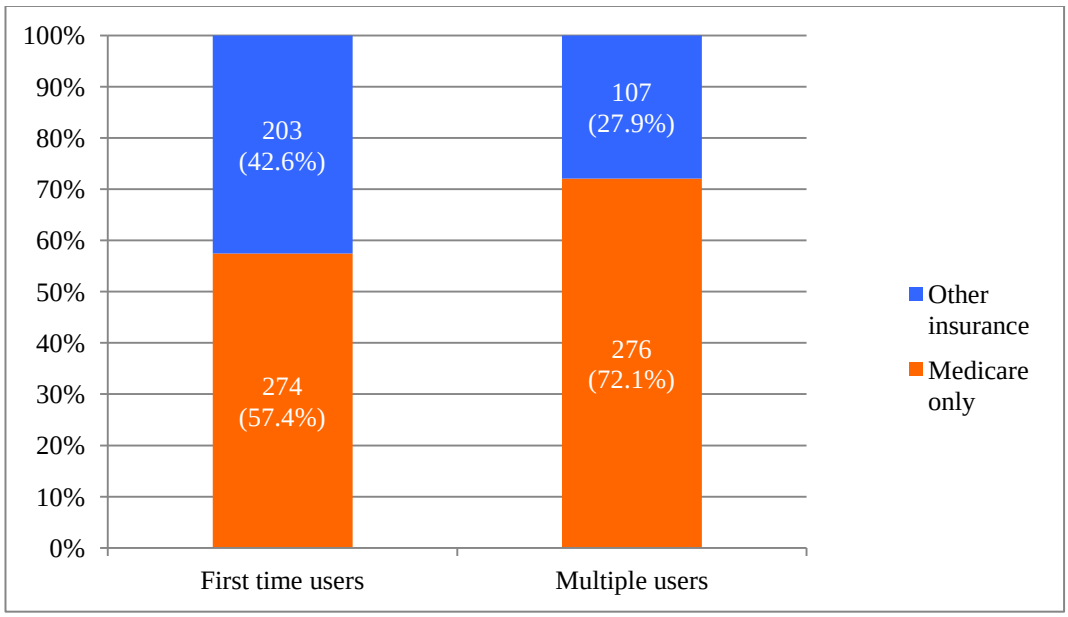


Figure 8.8 Insurance status and frequency of use variable

8.3.2.4 Analysis of the relationship between marital status and the frequency of use of emergency departments

There was a significant association between the marital status of patients and the frequency of use of the emergency departments $\chi^2(1) = 7.0$; $p < 0.001$. Cramer's V correlation coefficient of 0.09, indicated a weak relationship between these two variables. Almost two thirds of participants reported living in a relationship, but, as illustrated in Figure 8.9, people who used and returned to the emergency departments lived often without significant others (45%) as compared to first time users (36%). This proportion was reversed for first time users reporting having spouse or partner in 65% as compare to 56% of multiple users.

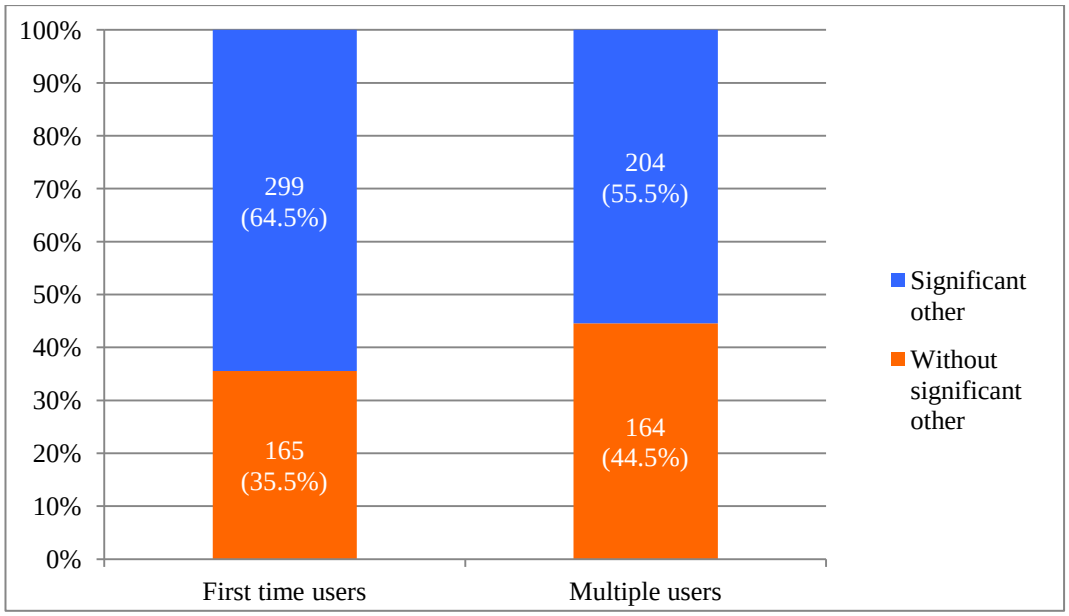


Figure 8.9 Participants' marital status and frequency of use variable

8.3.2.5 Analysis of the relationship between Indigenous status and the frequency of use of emergency departments

There was a significant association between patient's Indigenous status and the frequency of use $\chi^2(1) = 4{,}2$; $p < 0.05$. Cramer's V correlation coefficient of 0.07, indicated a weak relationship between these two variables. For the most part, emergency department users (95%) were not of Indigenous ethnicity. Nevertheless, multiple users reported Indigenous status 3% more often than first time users as illustrated in Figure 8.10.

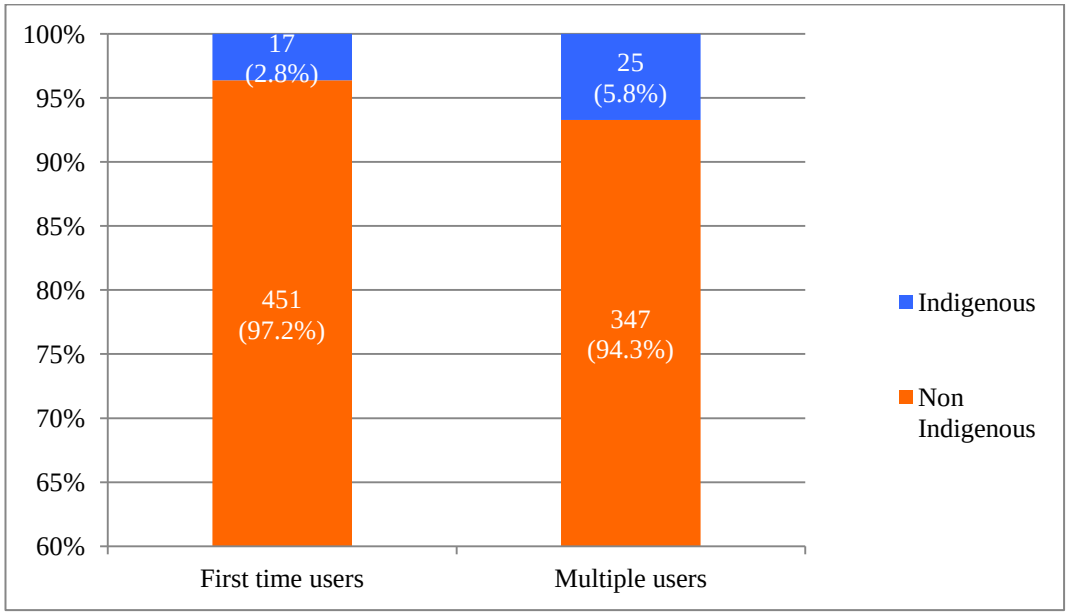


Figure 8.10 Patients' Indigenous status and frequency of use variable

8.3.2.6 Analysis of the relationship between employment status and the frequency of use of emergency departments

There was a significant association between patient's employment status and the frequency of use $\chi^2(1) = 18.6$; $p < 0.05$. Cramer's V correlation coefficient of 0.15, indicated a weak relationship between these two variables. As illustrated in Figure 8.11, almost 60% of participants were in the workforce at the time of the data collection process, although half of the multiple users were not working as compared to 35% of first time users.

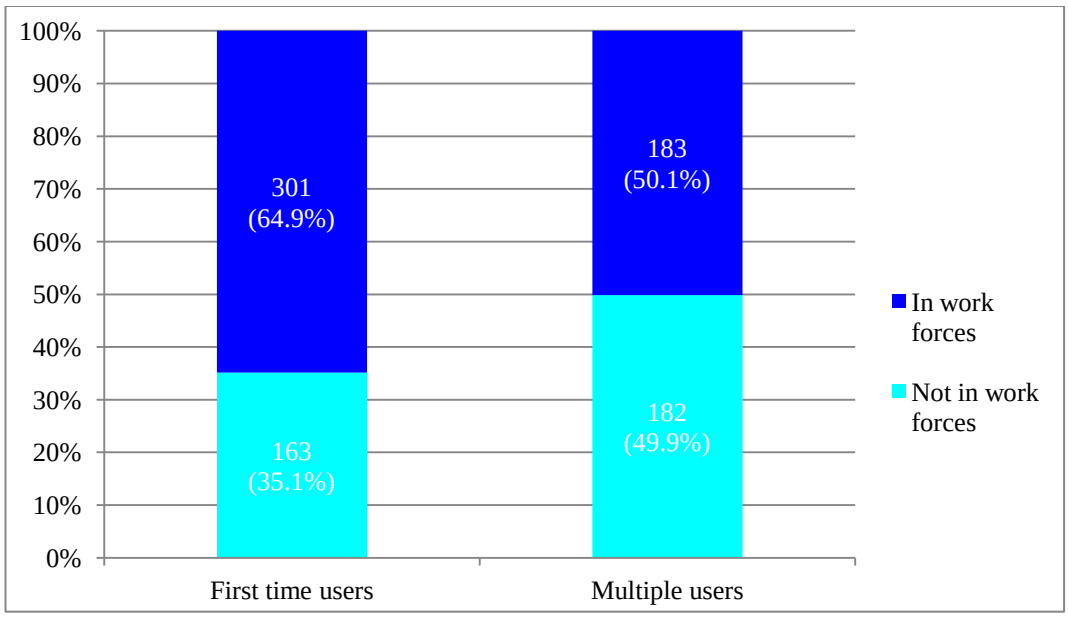


Figure 8.11 Employment status and the frequency of use variable

8.3.2.7 Summary of findings using Chi-square tests

The Chi-square analyses performed identified and differentiated further between characteristics of the two groups of emergency department patients. These are summarised in Table 8.4.

Table 8.4 Summary of characteristics based on Chi-square tests for the frequency of use variable

First time users more likely:	*Multiple users more likely :*
• made a decision to present when outside their usual residence; • presented without additional health conditions; • had insurance to supplement Medicare; • had a significant other; • were not Indigenous; • were in the workforce.	• made their decision to present to the emergency department at home; • had other existing conditions; • used Medicare as their only health insurance; • did not have a significant other; • were Indigenous; • were not currently working.

8.3.3 Results of the independent t-tests

Independent t-tests were performed between seven predicting variables and the frequency of emergency department use outcome variable, which was defined on two levels: first and multiple users of emergency departments. Table 8.5 shows the results of all tests performed. Also seen and marked in bold are tests that showed statistical significance.

Table 8.5 Summary of the independent t-tests results

	First time users		Multiple users						95% CI	
	Mean	SD[1]	Mean	SD[1]	Levene's test	t	df	P value	min	max
Age	43.9	17.5	41.9	19.2	0.03	1.59	773.2	0.112	-0.47	4.54
Condition related presentation	**8.6**	**2.5**	**9.2**	**2.2**	**0.00**	**-3.53**	**784.9**	**0.000**	**-0.91**	**-0.26**
Best services at EDs	**10.7**	**3.3**	**11.6**	**3.1**	**0.19**	**-3.62**	**819**	**0.000**	**-1.27**	**-0.38**
Social support	35.9	6.2	35.1	6.6	0.05	1.91	730.8	0.057	-0.03	1.77
Self efficacy	**22.1**	**4.1**	**21.0**	**4.7**	**0.02**	**3.40**	**706.7**	**0.001**	**0.45**	**1.69**
Perception of condition in the past	19.2	6.0	19.9	5.7	0.28	-1.85	864	0.064	-1.54	0.04
Perception of condition at present	**15.8**	**6.0**	**16.7**	**6.4**	**0.17**	**-2.26**	**845**	**0.024**	**-1.80**	**-0.13**

[1]Standard Deviation

Four out of seven tests reject the null hypothesis as statistically the means were significantly different. The details of these results are discussed individually below.

On average, multiple users of emergency departments (Mean=9.2, SD=2.2) more strongly believed that their condition required treatment at the emergency department than the first time users (Mean=8.6, SD=2.5). This difference, 0.6, 95% CI [-0.91, -0.26], was significant t(784.89) = 3.53; p < 0,001.

Multiple users (Mean=11.6, SD=3.1) on average sought care at the emergency department because they perceived hospital as being the best place for treatment of their condition. This was at odds with the group of first time users (Mean=10.7, SD=3.3). This difference, 0.9, 95% CI [-1.27 -0.38], was significant t(819) = 3.62; p < 0.001.

On the other hand, multiple users of emergency departments (Mean=21.0, SD=4.7) scored low on the self efficacy scale. This varied from the group of first time users (Mean=22.1, SD=4.1). The difference between the two groups, 1.1, 95% CI [0.45, 1.69], was significant t(706.73) = 3.4; p < 0,001.

Further, multiple users of emergency departments (Mean=16.7, SD=6.4) who perceived their condition as being very serious before presenting, differed on average

from the group of first time users (Mean=15.8, SD=6.0). This difference, 0.9, 95% CI [-1.80 -0.138], was significant t(845) = 2.26; p =0.024.

8.3.3.1 Summary of findings from the independent t-tests

The independent t-test analyses identified further differences between the characteristics of the two groups of emergency department patients. These are summarised in Table 8.6.

Table 8.6 Summary of characteristics based on the independent t-tests for the frequency of use variable

First time users less likely:	*Multiple users more likely:*
• believed that they needed to treat their condition in emergency departments; • perceived hospital as the best place for treatment of their condition; • see their condition as very serious; • had low levels of self efficacy.	• believed that their condition should be treated in emergency departments; • perceived hospital as the best place for treatment of their condition; • perceived their condition as serious; • had lower levels of self efficacy.

8.3.4 Summary of findings from bivariate analyses

A number of significant relationships were found between predictions and the outcome variable based on the abovementioned analyses. In short:

- Multiple users of emergency departments believed themselves to be more sick, and had additional and chronic health conditions. They also considered their condition serious at the time of making the decision to present to an emergency department and wanted to be treated in the hospital, as they believed that was the best and most convenient place for addressing their current health problem.
- Affordability factors such as low income, currently being out of workforce, and having only Medicare as insurance, played significant roles for patients who used emergency departments repeatedly over the six-month period.
- Personal circumstances such as the lack of a spouse or partner, having problems with communication in English, and being Indigenous were found to be significant factors for multiple users.
- Multiple users more often sought help somewhere else and made their decision from home to come to the hospital when no other help was available. High self-efficacy was found to be an important factor for reducing the number of times patients used an emergency department.

8.3.5 Logistic regression

In an effort to better assess whether the potential factors accurately predict the frequency of use of emergency departments, a binary logistic regression analysis was conducted. All 15 variables that had a relationship with the frequency of use of emergency department's outcome in previous tests were included in the model. Only four of the predicting variables (additional health conditions, commencement of the problem, self-efficacy, and condition-related presentations), however, made a unique and statistically significant contribution to the model as shown in Table 8.7. The Pseudo R Square statistics indicated that the model as a whole explained between 27% (Cox and Snell R Square =.269) and 36% (Nagelkerke R Square =.358) of the variance in the frequency of use of emergency departments. The strongest predictor for frequency of use of emergency departments was the existence of additional health problems with an odds ratio of 5.46. This indicated that respondents who had additional health problems were over five times more likely to present multiple times to the emergency departments, controlling for all other factors in the model. The second strongest predictor indicated that patients whose medical problem was of a chronic nature were 2.2 times more like to present and return to the emergency department, together with participants who believed that the presenting health problem required treatment at the hospital and who would, for every additional point on the scale, be 1.2 times more likely to present. The odds ratios were inversely proportional to and associated with the self-efficacy scale, and indicated that for every additional point respondents were .84 times less likely to present multiple times to the emergency departments.

Table 8.7 Logistic regression predicting the likelihood of frequency of use of emergency departments

Predictor	B	S.E.	OR	95% CI for OR	df	Sig
Other existing conditions	1.70	0.54	5.463	(1.91; 15.66)	1	0.00075
Commencement of health problem	0.81	0.28	2.239	(1.30; 3.85)	1	0.0153
Self-efficacy	-0.165	0.073	0.8475	(0.74; 0.98)	1	0.01281
Condition-related presentation	0.23	0.11	1.264	(1.02; 1.57)	1	0.02880

8.3.6 Summary of findings for the frequency of use outcome variable

There were a number of differences found between the two groups of users pertaining to the nature of the health problem, affordability factors, and personal circumstances, as well as self-efficacy. The final analysis, however, showed that prediction of multiple

uses of emergency departments relates strongly to patient's perception of their own health status and the only factor that decreases this chance is a patient's own ability to deal with the difficulty of the situation that they might be in, as higher scores on self-efficacy showed a decrease in the probability of presenting to the emergency departments.

8.4 ARRIVAL MODE VARIABLE

8.4.1 Results of Mann-Whitney *U* tests

Mann - Whitney *U* tests were performed between nine predicting variables and the arrival mode to the emergency department outcome variable, which was defined on two levels: arrival by ambulance and by other means of transport. It should be noted also that the last category to a greater extent represents participants who arrived by their own vehicle, via family/friends, used public transport or taxi, or walked in. Less than one percent of respondents in this category reported as being transported by the police. Table 8.8 shows the results of all tests conducted. Tests that showed statistical significance are marked in bold.

Table 8.8 Results of the Mann - Whitney *U* tests

	Ambulance	Other	Mann-Whitney	P value
	Mean ranks		(000)	
Commencement of medical problem	418.5	432.6	68.2	0.438
Perceived overall health status	**355.3**	**453.2**	**53.9**	**< 0.001**
Patients' perceived priority	**468.0**	**384.2**	**49.3**	**< 0.001**
Availability of other health or GP services	442.5	425.6	68.1	0.291
Length of stay in Australia	**110.5**	**90.8**	**2.6**	**0.014**
English fluency	428.4	425.1	6.85	0.725
Education level	380.0	406.8	56.8	0.099
Education in Australia	396.8	415.3	61.7	0.210
Income	**304.9**	**373.0**	**37.7**	**< 0.001**

In four out of nine tests the null hypothesis was rejected as the differences in mean ranks were significantly different. The details of these four tests are discussed separately below.

8.4.1.1 Analysis of the relationship between the perceived overall health status and the arrival mode variable

Participants who arrived to emergency departments by ambulance (*mean rank=355.3*) differ significantly from participants who came by themselves or by other means of transport (*mean rank=453.2*); U = 53 858.500; Z = -5.24; p < 0.001.

Figure 8.12 presents the relationships between patients' perception of their own health condition and the arrival method they used to come to the emergency departments and shows that a larger proportion (13%) of participants who were sicker in their own opinion chose to use the ambulance as compared to the participants who came by themselves or arrived by another means of transport.

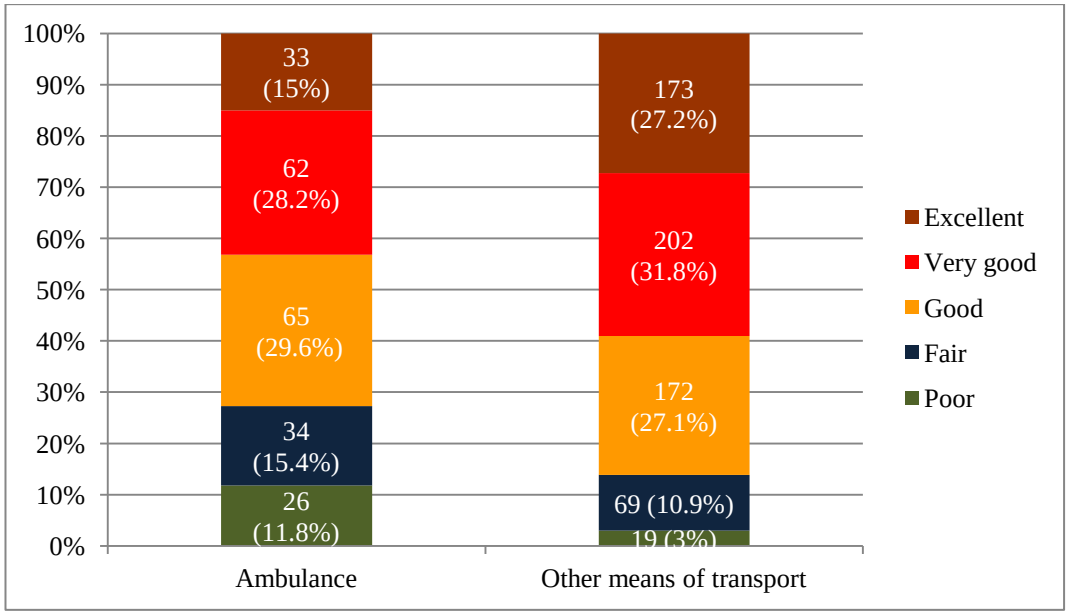


Figure 8.12 Perceived overall health status and the arrival mode variable

8.4.1.2 Analysis of the relationship between a patient's perceived priority and the arrival mode variable

Participants who arrived to emergency departments by ambulance (*mean rank= 468.0*) differ significantly from those who came by themselves or by another means of transport (*mean rank=384.2*); U = 49 335.500; Z = -4.59; $p < 0.001$. Interestingly, a greater number of participants who felt their condition required urgent attention and wanted to be seen quickly (up to 10 minutes) by medical staff, decided to come to the emergency department using their own or other types of transport rather than calling the ambulance (38.4% and 24.3% respectively). Figure 8.13 illustrates the distribution of answers.

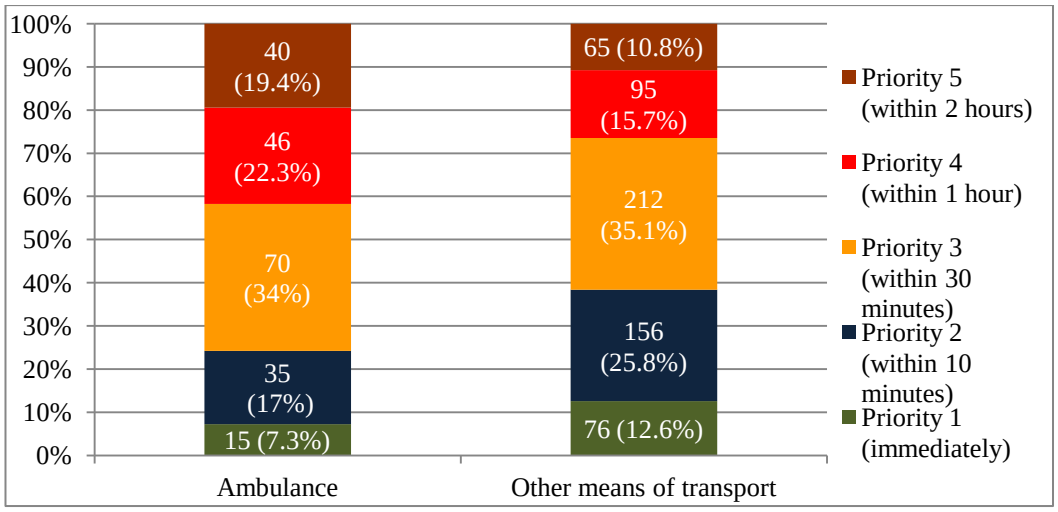


Figure 8.13 Perceived priority and the arrival mode variable

8.4.1.3 Analysis of the relationship between the length of stay in Australia and the arrival mode variable

Participants who arrived to emergency departments by ambulance (*mean rank=110.5*) differ significantly from those who came by themselves or by another means of transport (*mean rank=90.8)*; U = 2 286.000; Z = -1.06; $p < 0.05$. Almost two thirds of participants who migrated to Australia lived here already (11 or more years). There were, however, notable differences between a participant's length of stay in the country and the use of ambulance services. Participants who lived long term in Australia more often used the ambulance (20%), as opposed to participants who were new to the country and came more often by themselves (8%) as shown on Figure 8.14.

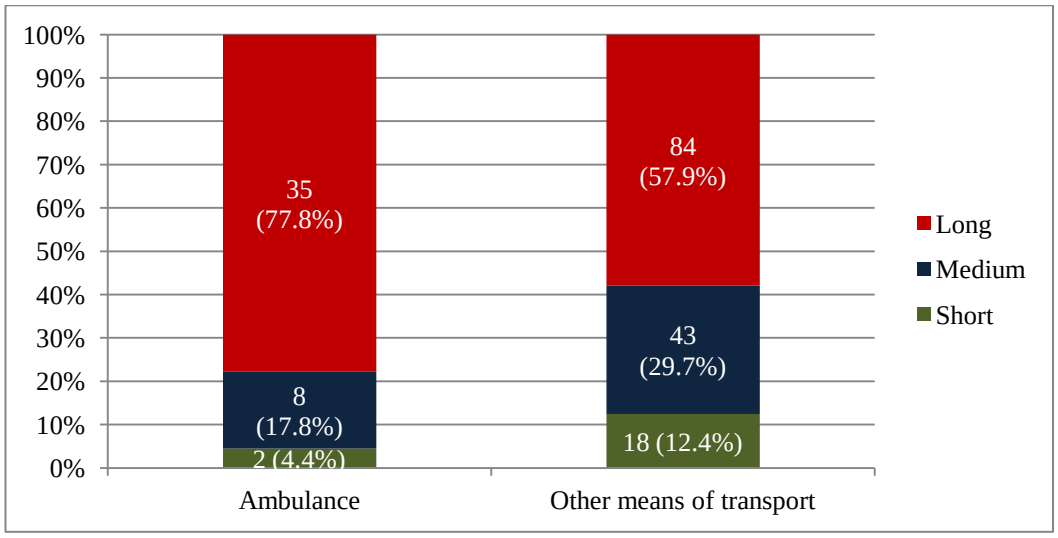


Figure 8.14 Length of stay in Australia and the arrival mode variable

8.4.1.4 Analysis of the relationship between a patient's weekly income and the arrival mode variable

Participants who arrived to the emergency departments by ambulance (*mean rank=304.9*) differ significantly from those who came by themselves or by another means of transport (*mean rank=373)*; U = 37 771.000; Z = -3.92; p < 0.001.

Figure 8.15 shows that participants with a weekly household income below $1000 (12%), more often used the ambulance as a method of transport as compared to higher earners (above $1000 weekly) who were more likely to come by another means of transport (46% and 34% respectively).

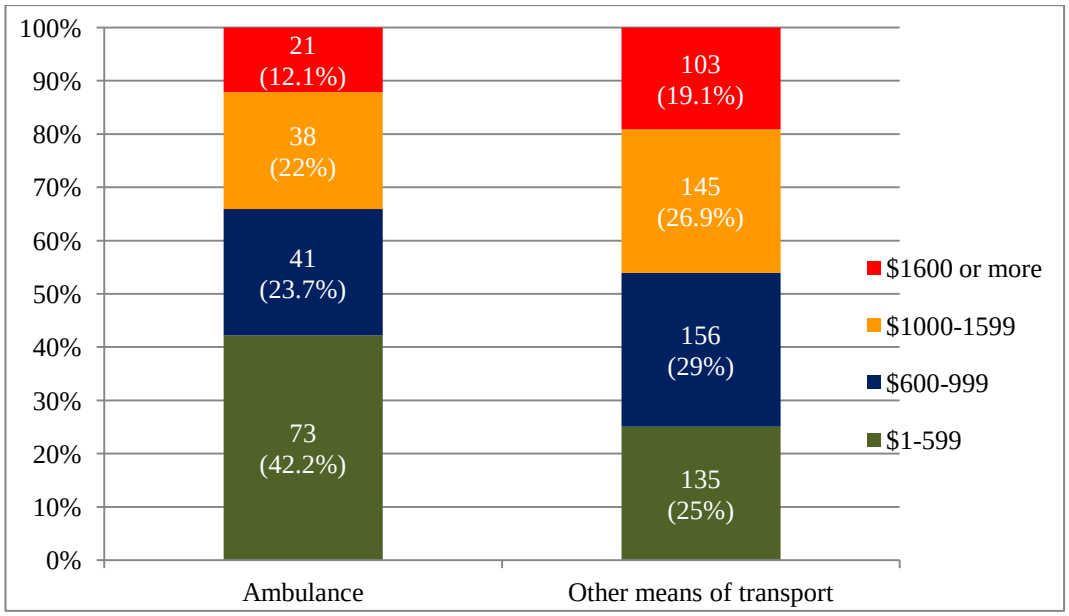


Figure 8.15 Participant's weekly income and the arrival mode variable

8.4.1.5 Summary of findings from Mann-Whitney *U* tests

The findings from the above bivariate analyses underline significant characteristics of the two groups of emergency department users as summarised in Table 8.9.

Table 8.9 Summary of characteristics based on Mann-Whitney *U* tests for the mode of transport variable

Ambulance users more likely:	*Users of other means of transport more likely:*
• were more sick in their own opinion; • were prepared to wait longer before receiving treatment; • lived a long time in Australia; • were low income earners.	• were in a good health: • perceived their condition as very urgent; • were recent migrants; • were higher income earners.

8.4.2 Results of Pearson's Chi-square tests

Pearson's Chi-square tests were performed between 13 predicting variables and the mode of arrival to the emergency department outcome variable, which was defined on two levels: arrival by ambulance and by other means of transport. Table 8.10 shows the results of all tests performed and the tests that showed statistical significance are marked in bold.

Table 8.10 Summary of Chi-square tests

	χ^2	P value	V Cramer	C Pearson
Place where decision was made	0.2	0.664	0.015	0.015
Arrival with or without accompanying person	2.6	0.107	0.055	0.055
Other health conditions	**36.5**	**< 0.001**	**0.206**	**0.202**
Contact prior to coming	**49.9**	**< 0.001**	**0.242**	**0.235**
Suggestion made	**16.9**	**< 0.001**	**0.142**	**0.141**
Gender	1.0	0.307	0.035	0.035
Living arrangements	**15.0**	**< 0.001**	**0.133**	**0.132**
Insurance status	1.1	0.291	0.036	0.036
Immigrant status	0.2	0.618	0.017	0.017
Marital status	3.4	0.067	0.064	0.064
Indigenous status	0.5	0.489	0.024	0.024
Employment status	**20.9**	**< 0.001**	**0.159**	**0.157**
Survey Type	**22.9**	**< 0.001**	**0.163**	**0.161**

Six out of 13 tests showed evidence of a significant relationship between two variables. The details of these six tests are discussed individually below.

8.4.2.1 Analysis of the relationship between a patient's other health conditions and the arrival mode variable

There was a significant association between participant's other health conditions and the arrival method $\chi^2(1) = 36.5$; $p < 0.05$. Cramer's V correlation coefficient of 0.20, indicated a weak relationship between these two variables. Patients who reported having other health conditions were more likely to use an ambulance than come into the emergency department by themselves (48% and 26% respectively) as illustrated in Figure 8.16.

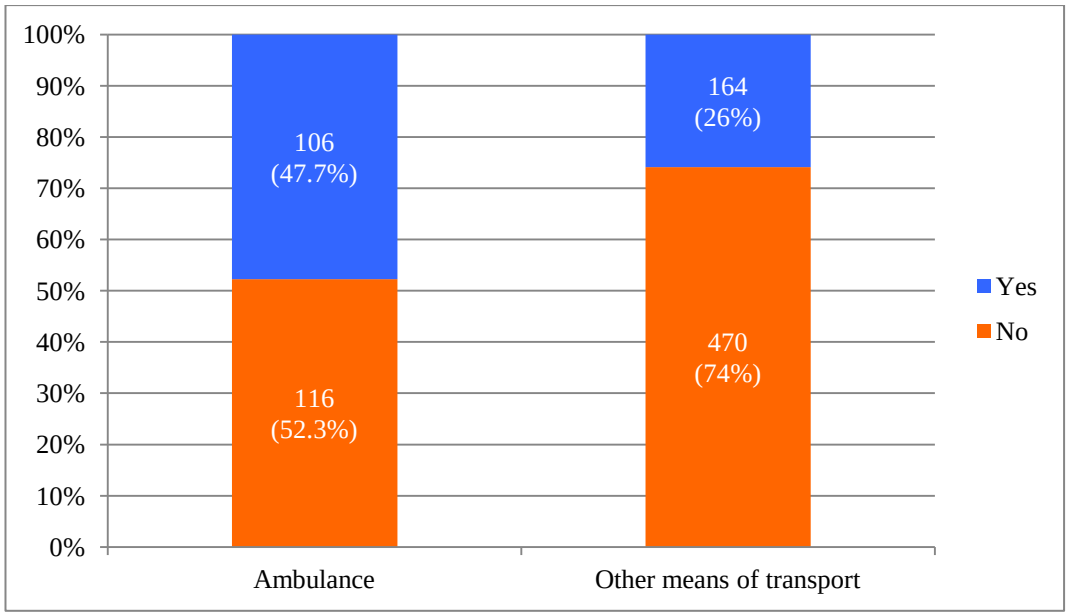


Figure 8.16 Patient's other health conditions and the arrival mode variable

8.4.2.2 Analysis of the relationship between contact made by patients prior to coming and the arrival mode variable

There was a significant association between contacting somebody prior to coming into the hospital and the arrival method $\chi^2(1) = 49.9$; $p < 0.05$. Cramer's V correlation coefficient of 0.24, indicated a weak relationship between these two variables. Figure 8.17 indicates that participants who made contact with someone regarding their condition prior to coming into the emergency department were more likely to use an ambulance than those who came in by themselves (79% and 52% respectively). Almost 60% of participants contacted somebody prior to coming into the emergency department regardless of the transport method used.

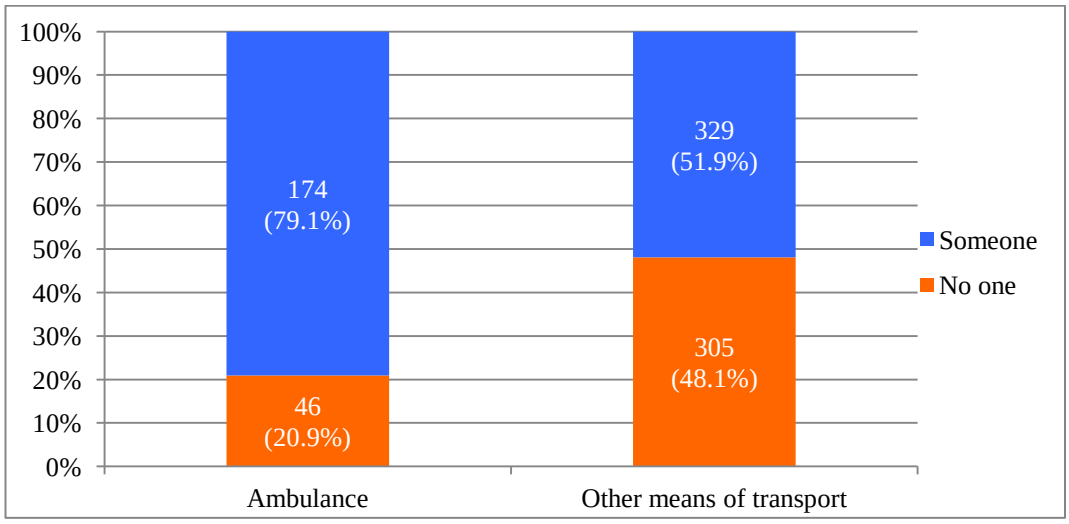


Figure 8.17 Contact made prior to coming and the arrival mode variable

8.4.2.3 Analysis of the relationship between a suggestion made and the arrival mode variable

There was a significant association between a suggestion made to the participants and the arrival method $\chi^2(1) = 16.9$; $p < 0.05$. Cramer's V correlation coefficient of 0.14, indicated a weak relationship between these two variables. The majority of participants (78%) recalled receiving a suggestion to come into the emergency department from different people. Figure 8.18 shows, however, that participants who received such a suggestion prior to coming into the emergency department were more likely to use an ambulance than those who came in by themselves (88% and 75% respectively).

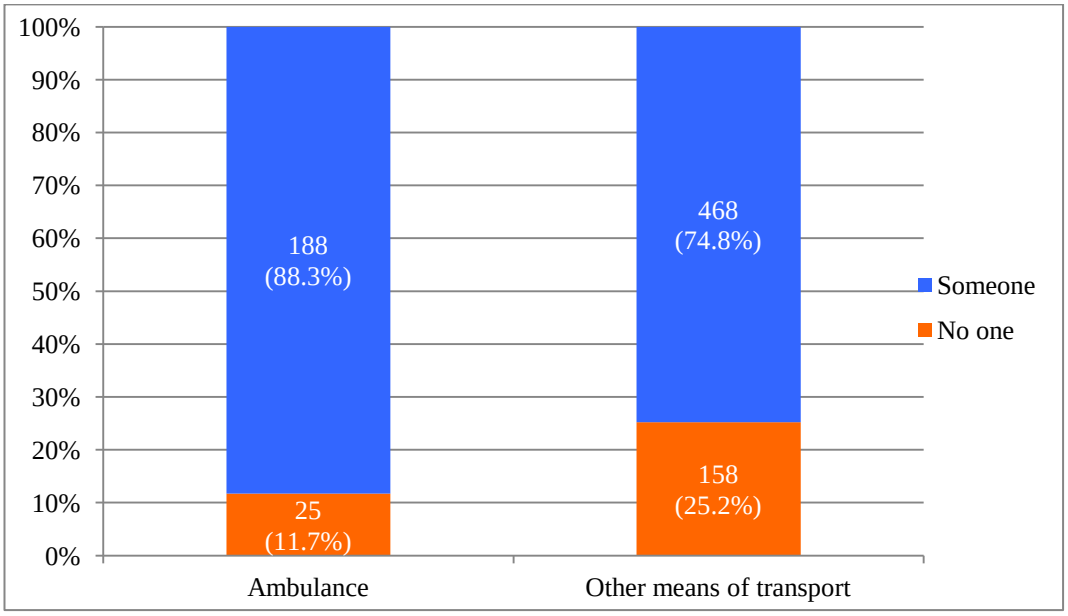


Figure 8.18 Suggestion made by someone and the arrival method variable

8.4.2.4 Analysis of the relationship between a patient's living arrangements and the arrival mode variable

There was a significant association between a participant's living arrangements and the arrival method $\chi^2(1) = 15.04$; $p < 0.05$. Cramer's V correlation coefficient of 0.13, indicated a weak relationship between these two variables. The vast majority of participants (88%) lived with somebody at the time of their health problems, but, as illustrated in Figure 8.19, patients who came to the emergency department by ambulance were more likely to be living alone that than those who came by themselves (20% and 10% respectively).

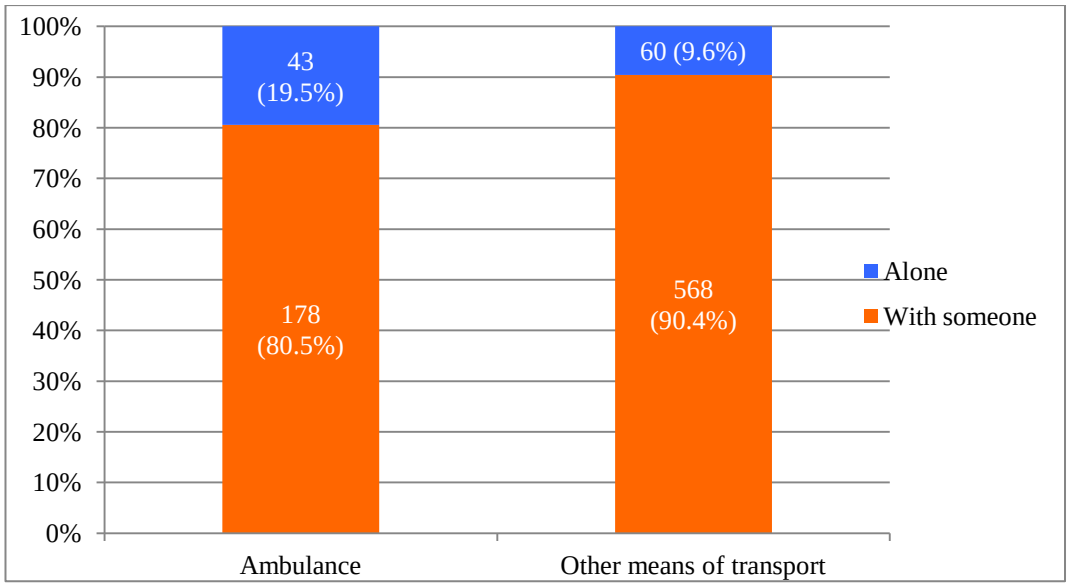


Figure 8.19 Participant's living arrangements and the arrival method variable

8.4.2.5 Analysis of the relationship between a patient's employment status and the arrival mode variable

There was a significant association between a participant's employment status and the arrival method $\chi^2(1) = 20.9$; $p < 0.001$. Cramer's V correlation coefficient of 0.16, indicated a weak relationship between these two variables. The majority of participants were working (59%) at the time of presentation. Patients who came to the emergency department by ambulance, however, were for the most part not working at that time (55%) as compared to self-transported users (36%) as illustrated in Figure 8.20.

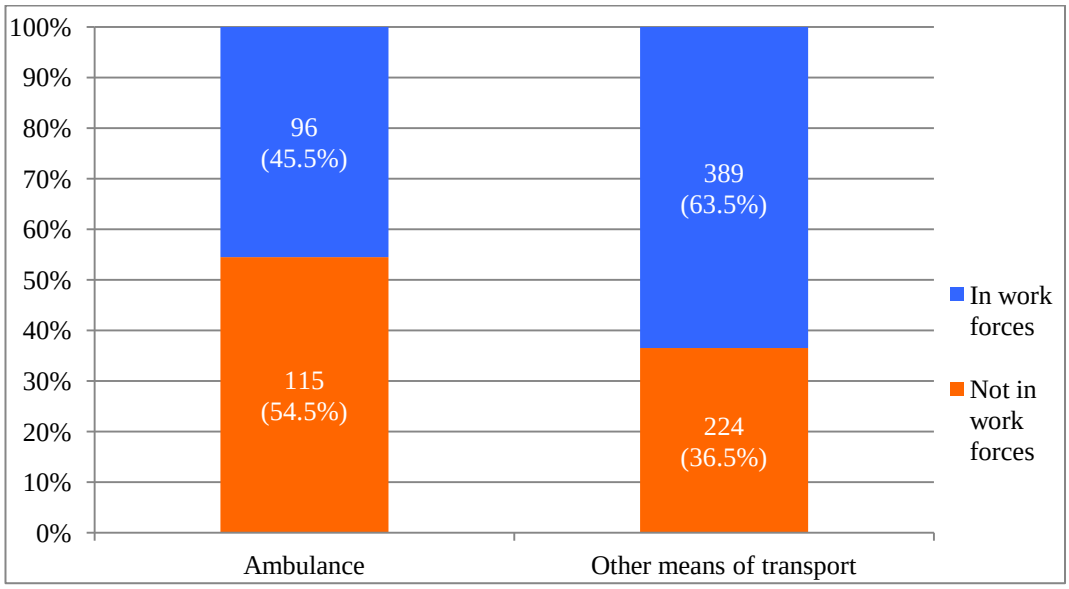


Figure 8.20 Participant's employment status and the arrival method variable

8.4.2.6 Analysis of the relationship between survey type and the arrival mode variable

There was a significant association between the survey type and the arrival method $\chi^2(1) = 22.9$; $p < 0.001$. Cramer's V correlation coefficient of 0.16, indicated a weak relationship between these two variables. Three quarters of participants came to emergency departments by themselves, but as illustrated in Figure 8.21, adult patients who presented to the emergency department more likely came by ambulance than by themselves (87% and 71% respectively). Understandably, parents brought their children to the hospital by themselves more often than adults, and used their own transport to come (28% and 13% respectively).

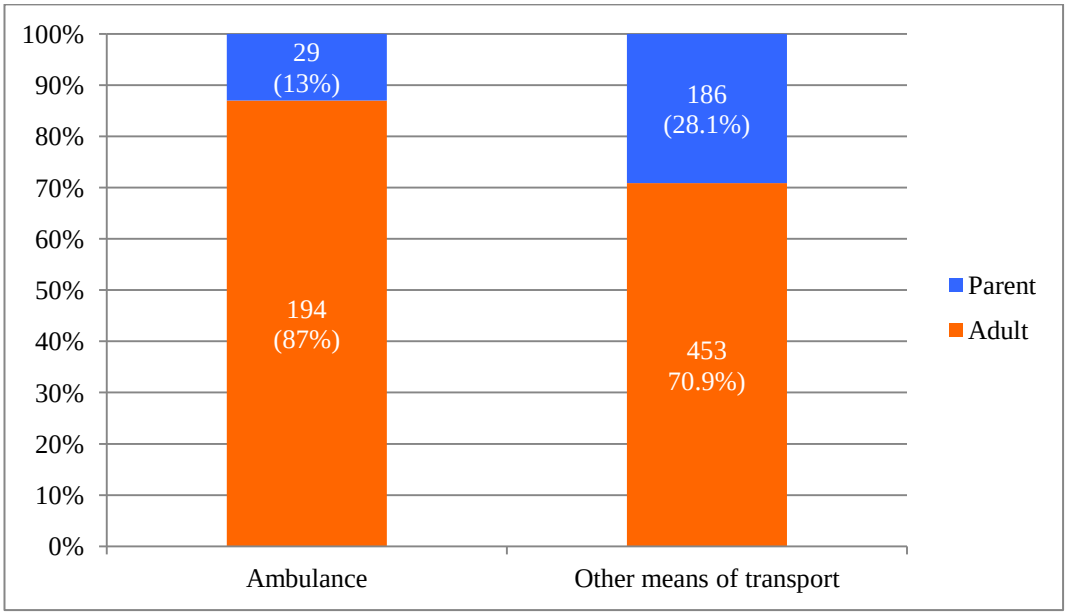


Figure 8.21 Survey type and the arrival method variable

8.4.2.7 Summary of findings from Chi-square tests

Chi-square analyses identified further differences between characteristics of the two groups of emergency department patients. These are summarised in Table 8.11.

Table 8.11 Summary of characteristics based on Chi-square tests for the arrival mode variable

Ambulance users more likely:	*Users of other means of transport more likely:*
• had other existing conditions: • made contact before coming, • received a suggestion to come; • lived on their own; • were not currently working; • were an adult patient.	• presented without additional health conditions: • did not contact anybody before coming; • no suggestion was made to them; • lived with somebody at home; • were in the workforce; • were a parent of a young patient.

8.4.3 Results of the independent t-tests

Independent t-tests were performed between seven predicting variables and the mode of transport to the emergency department outcome variable. The latter was defined on two levels: ambulance arrival and arrival by other means of transport. Table 8.12 shows the results of all tests performed together with the tests that showed statistical significance marked in bold.

Table 8.12 Summary of the independent t-tests results

	Ambulance		Other means						95% CI	
	Mean	SD[1]	Mean	SD[1]	Levene's test	t	df	P value	min	max
Age	**50.9**	**20.7**	**40.2**	**16.5**	**0.000**	**-6.86**	**212.6**	**0.0001**	**-13.8**	**-7.6**
Condition related presentation	**9.6**	**2.4**	**8.7**	**2.3**	**0.430**	**-5.10**	**769**	**0.0001**	**-1.37**	**-0.61**
Best services at EDs	11.1	3.3	11.1	3.3	0.821	0.46	798	0.6464	-0.40	0.64
Social support	34.9	6.6	35.8	6.2	0.118	1.86	789	0.0628	-0.05	1.98
Self efficacy	**20.4**	**4.9**	**22.0**	**4.1**	**0.024**	**4.19**	**298.8**	**0.0001**	**0.86**	**2.38**
Perception of condition in the past	**21.1**	**6.3**	**18.9**	**5.6**	**0.054**	**-4.88**	**833**	**0.0001**	**-3.15**	**-1.34**
Perception of condition at present	**14.9**	**6.7**	**16.5**	**6.0**	**0.054**	**3.17**	**816**	**0.0016**	**0.60**	**2.55**

[1]Standard Deviation

Five out of seven tests reject the null hypothesis, as the means were statistically of significant difference. The details of these results are discussed individually below.

On average, patients who came to the emergency departments by ambulance (Mean=50.9, SD=20.7) were older than patients who travelled by their own means of transport or by other means (Mean=40.2, SD=16.5). This difference, 10.7, 95% CI [-13.8, -7.6], was significant $t(212.6) = -6.86$; $p < 0.001$.

Participants who came to the emergency department by ambulance, on average believed that their condition was more serious and urgently requiring treatment at the hospital (Mean=9.6, SD=2.4) than participants who arrived by other means (Mean=8.7, SD=2.3). This difference, 0.9, 95% CI [-1.37, -0.61], was significant $t(769) = -5.10$; $p < 0.001$.

On the other hand, patients that came by themselves to the emergency departments, on average (Mean=22.0, SD=4.1) received high scores on the self efficacy scale and varied from those in the group of ambulance users (Mean=20.4, SD=4.9). The difference between the two groups, 1.6, 95% CI [0.86, 2.38], was significant $t(298.8) = 4.19$; $p < 0.001$.

Also, participants who used the ambulance to come to the hospital perceived on average (Mean=21.1, SD=6.3) that their condition was more serious at the time of

making the decision than participants who came by themselves (Mean=18.9, SD=5.6). This difference, 2.2, 95% CI [-3.15, -1.34], was significant $t(833) = -4.88$; $p < 0.001$.

Interestingly, participants who came by themselves to the emergency departments, on average (Mean=16.5, SD=6.0) perceived their presenting health problem at the hospital as being more serious and urgent than participants who came in by ambulance (Mean=14.9, SD=6.7). This difference, 1.6, 95% CI 0.60, 2.55], was significant $t(816) = 3.17$; $p = 0.0016$.

8.4.3.1 Summary of findings from the independent t-tests

The independent t-test analyses identified further differences between characteristics of the two groups of emergency department patients. These are summarised in Table 8.13.

Table 8.13 Summary of characteristics based on the independent t-tests for the mode of transport variable

Ambulance users more likely:	*Other means of transport users less likely:*
• were older; • believed their condition required treatment in an emergency department; • believed in the seriousness of their condition at the time of making their decision; • believed in seriousness of their condition while already in an emergency department; • had low levels of self efficacy.	• were older; • believed they required treatment in emergency departments; • perceived hospital as the best place to address their health needs; • perceived their condition as serious; • had lower levels of self efficacy.

8.4.4 Summary of findings from bivariate analyses

A number of significant relationships were found between the predicting and outcome variables based on the abovementioned analyses. In short:

- Participants who used the ambulance to travel to emergency departments believed themselves to be more sick and had additional conditions. They also considered their condition as serious at the time of making their decision and wanted to be treated in hospital, as they believed it to be the best and most convenient place for addressing their current health problem. People who travelled by other means wanted to receive care quickly, even if they believed in the seriousness of their presenting condition.

- Affordability factors such as low income and currently being out of the workforce played a significant role for participants who used an ambulance to come into the emergency departments.
- Personal circumstances such as being an older person, long resident migrant, and living on their own, were found to be significant factors for ambulance users.
- Ambulance users more often contacted someone and received suggestion from others before presenting to the hospital. High self efficacy and being a parent of an underage patients were found to be important factors for participants who decided to come by other than ambulance means of transport.

8.4.5 Logistic regression

To assess whether the potential factors predict the mode of transport arrival to the emergency department, a binary logistic regression analysis was conducted. All 15 variables that had a relationship with the arrival method outcome variable in previous tests where included in the model. Only three of the predicting variables (contact made prior to coming, self-efficacy, and perceived seriousness in the past), however, made a statistically unique and significant contribution to the model as shown in Table 8.14. The Pseudo R Square statistics indicated that the model as a whole explained between 21% (Cox and Snell R Square =.209) and 33.2% (Nagelkerke R Square =.332) of the variance in the arrival method to emergency departments. The strongest predictor for the use of ambulance as a method of transport to emergency departments was the fact of making contact with somebody (an odds ratio of 7.87). This indicated that respondents who made contact and spoke with somebody about their condition were almost eight times more likely to come to the emergency department by ambulance, controlling for all other factors in the model. The other strong predictor indicated that participants who perceived their condition as being serious at the time of making the decision to come to the hospital were 1.2 times more likely to come by ambulance to the emergency department. The odds ratio was inversely associated with the self-efficacy scale and indicated that for every additional point respondents were .80 times less likely to use an ambulance to come to the emergency department.

Table 8.14 Logistic regression predicting the likelihood of the arrival mode to emergency departments

Predictor	B	S.E.	OR	95% CI for OR	df	Sig
Contact prior coming	2.06	0.81	7.867	(1.62; 38.15)	1	0.00147
Self efficacy	-0.23	0.09	0.795	(0.67; 0.94)	1	0.00233
Seriousness in the past	0.14	0.06	1.150	(1.03; 1.29)	1	0.00774

8.4.6 Summary of findings for the arrival method outcome variable

Three quarters of participants arrived to the emergency department by themselves. They perceived the nature of their presenting health problem differently, as affordability factors were less concerning for them and in general, they had a high self-efficacy when compared with the quarter of patients who use ambulance services. The prediction analysis, however, showed that the likelihood of choosing an ambulance rather than coming in by themselves to the emergency departments relates strongly to making contact with somebody prior to coming together with a participant's perception of the seriousness of a patient's condition. High self-efficacy among participants remains a strong factor among those choosing their own transport to come into the hospital.

8.5 PARTICIPANT'S OWN DECISION VERSUS A DECISION MADE BY SOMEBODY ELSE

8.5.1 Results of Mann-Whitney *U* tests

Mann - Whitney *U* tests were performed between nine predicting variables and the outcome variable measuring the use of emergency departments by participants who made the decision to attend by themselves and participants for whom that decision was made by others. Table 8.15 shows the results of all tests performed and those tests that showed statistical significance are marked in bold.

Table 8.15 Results of the Mann - Whitney *U* tests

	Participant's own decision	Decision made by others	Mann-Whitney	P value
	Mean Ranks		(000)	
Commencement of medical problem	442.0	444.3	93.9	0.908
Perceived overall health status	**460.2**	**415.9**	**85.0**	**0.010**
Patients' perceived priority	**398.4**	**447.0**	**73.9**	**0.003**
Availability of other health or GP services	423.1	439.2	85.4	0.253
Length of stay in Australia	91.6	96.9	4.0	0.439
English fluency	426.6	420.3	85.1	0.386
Education level	408.2	393.0	74.7	0.298
Education in Australia	418.7	400.1	78.0	0.240
Income	362.7	349.2	58.5	0.338

In two out of nine tests the null hypothesis was rejected, as the differences in mean ranks were significantly different. The details of these two tests are discussed individually below.

8.5.1.1 Analysis of the relationship between the perception of overall health status and the decision made by participants or somebody else to use the emergency department

The group of participants who made the decision to come to the emergency department by themselves (*mean rank=460.2*) differ significantly from the group of users for whom that decision was made on their behalf (*mean rank=415.9)*; U = 85 052.000; Z = -0.115; p < 0.05. Figure 8.22 shows that patients who made their own decision more often (50%) perceived their overall health as poor, fair, or even good rather than patients for whom somebody else decided (40%).

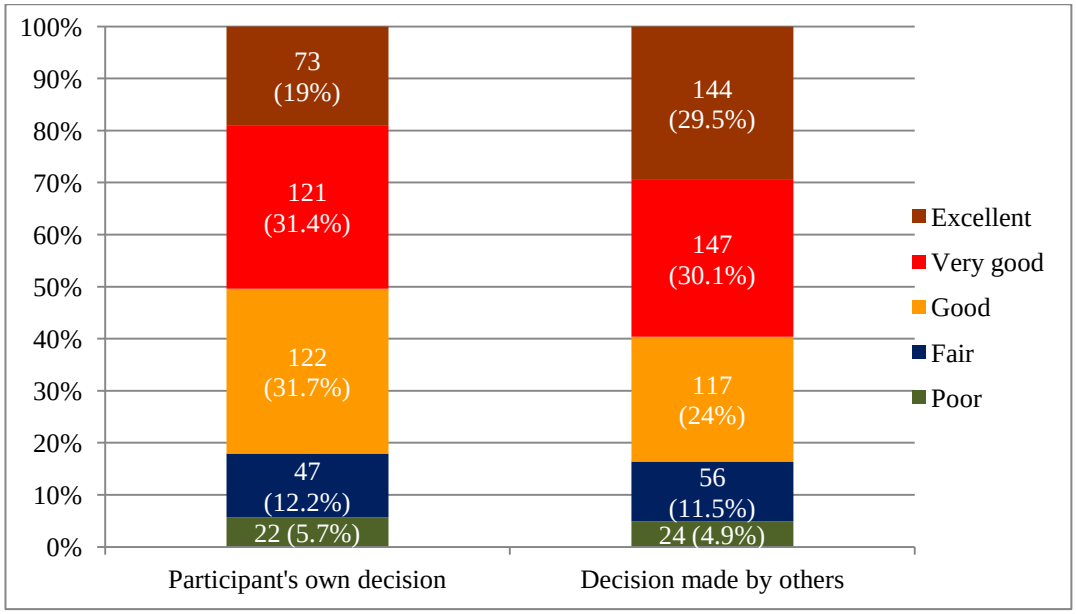


Figure 8.22 Overall health status and decision-maker variable

8.5.1.2 Analysis of relationship between participants' perceived priority and the decision made by participant or somebody else to use the emergency department

The group of participants who made the decision to come to the emergency department by themselves (*mean rank=398.4)* differ significantly from the group of users for whom that decision was made on their behalf (*mean rank=447.0)*; U = 73 968.000; Z = -2.98; p < 0.05. Understandably, participants who perceived their or a patient's condition as urgent and wanted to be seen within a short period of time were more likely (39%) to make the decision of their own accord to come into

emergency department as compared to participants for whom somebody made such a decision (32%). Figure 8.23 illustrates these associations.

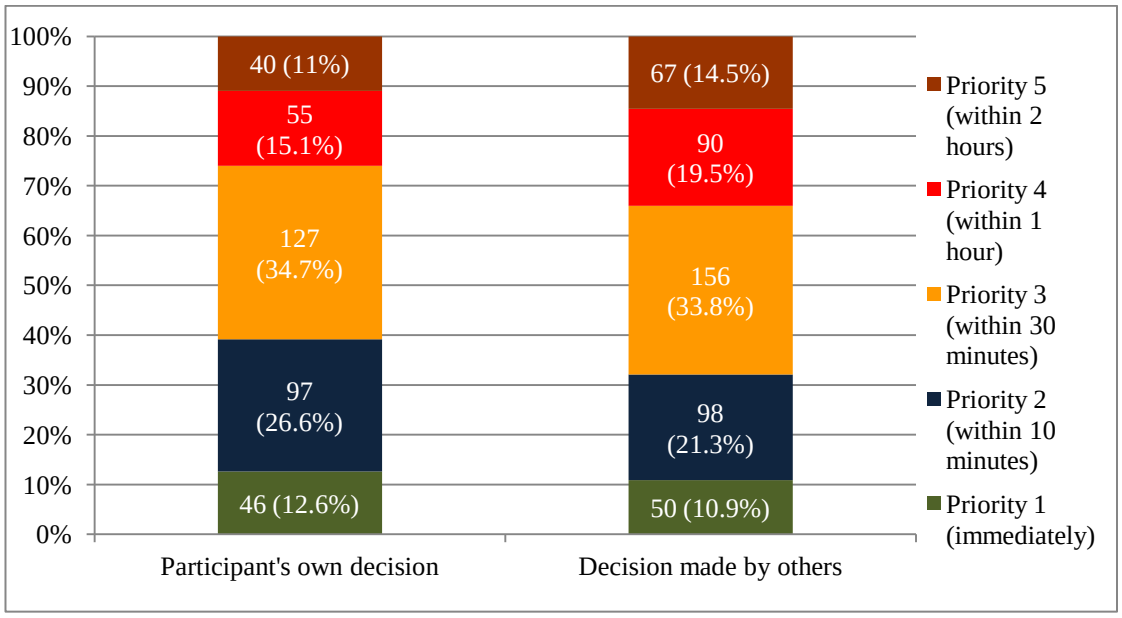


Figure 8.23 Participants' perceived priority and the decision-maker variable

8.5.1.3 Summary of findings from Mann-Whitney *U* tests

The findings from the above bivariate analyses underline noteworthy characteristics of the two groups of emergency department users as indicated in Table 8.16.

Table 8.16 Summary of characteristics based on Mann-Whitney *U* tests for the decision-maker variable

Participant's who made their own decision more likely:	*Participant's for whom the decision was made by others more likely:*
• perceived themselves as being more sick; • recognised their current health problem as more urgent.	• were satisfied with their own health; • were prepared to wait longer before receiving treatment.

8.5.2 Results of Chi-square tests

Pearson's Chi-square tests were performed between 13 predicting variables and the outcome variable measuring the use of emergency departments by participants who made the decision to attend by themselves and patients for whom that decision was made by others. Table 8.17 shows results of all tests performed and the tests that showed statistical significance are marked in bold.

Table 8.17 Summary of Chi-square tests

	χ^2	P value	V Cramer	C Pearson
Place where the decision was made	**22.4**	**< 0.001**	**0.159**	**0.157**
Arrival with or without accompanying person	**32.3**	**< 0.001**	**0.191**	**0.188**
Other health conditions	**7.6**	**< 0.001**	**0.093**	**0.093**
Contact prior to coming	**66.9**	**< 0.001**	**0.276**	**0.266**
Suggestion made	**141.9**	**< 0.001**	**0.405**	**0.375**
Gender	0.0	0.873	0.005	0.005
Living arrangements	0.2	0.671	0.015	0.015
Insurance status	1.3	0.253	0.039	0.039
Immigrant status	0.4	0.529	0.021	0.021
Marital status	1.3	0.246	0.040	0.040
Indigenous status	1.1	0.297	0.036	0.036
Employment status	0.1	0.723	0.012	0.012
Survey Type	**15.2**	**< 0.001**	**0.131**	**0.130**

Six out of 13 tests showed a significant relationship between two variables. The details of these six tests are discussed individually below.

8.5.2.1 Analysis of the relationship between the place where a decision was made and the decision made by participants or somebody else to use the emergency department

There was a significant association between the place where a decision was made and the decision maker $\chi^2(1) = 22.4$; $p < 0.05$. Cramer's V correlation coefficient of 0.16, indicated a weak relationship between these two variables. As illustrated in Figure 8.24, the majority (61%) of patients were at home when deciding where to seek care. However, other people made the decision to present more often for participants who were outside of their usual residence as compared to participants who made their own decision while being out of home (49% and 33% respectively).

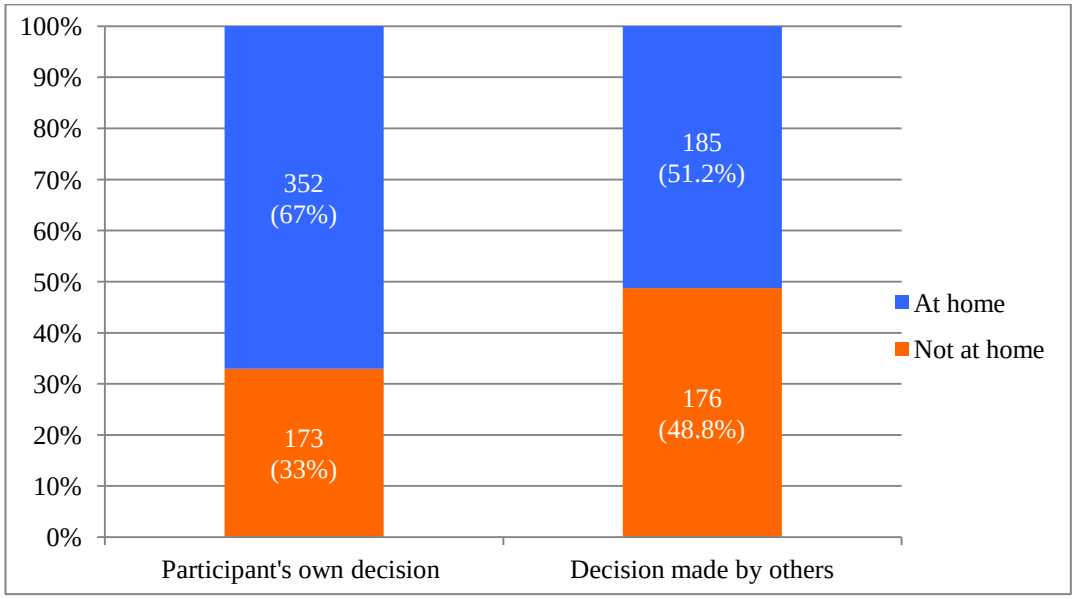


Figure 8.24 Place where the decision was made and the decision-maker variable

8.5.2.2 Analysis of the relationship between arrival with or without an accompanying person and the decision made by participants or somebody else to use the emergency department

There was a significant association between the arrival with or without an accompanying person and the decision maker variable $\chi^2(1) = 32.3$; $p < 0.05$. Cramer's V correlation coefficient of 0.19, indicated a weak relationship between these two variables.

Figure 8.25 shows that the vast majority of patients (80%) arrived to the hospital with somebody by their side. However, participants who decided to present themselves more often came unaccompanied as opposed to those participants for whom somebody else decided (27% and 11% respectively).

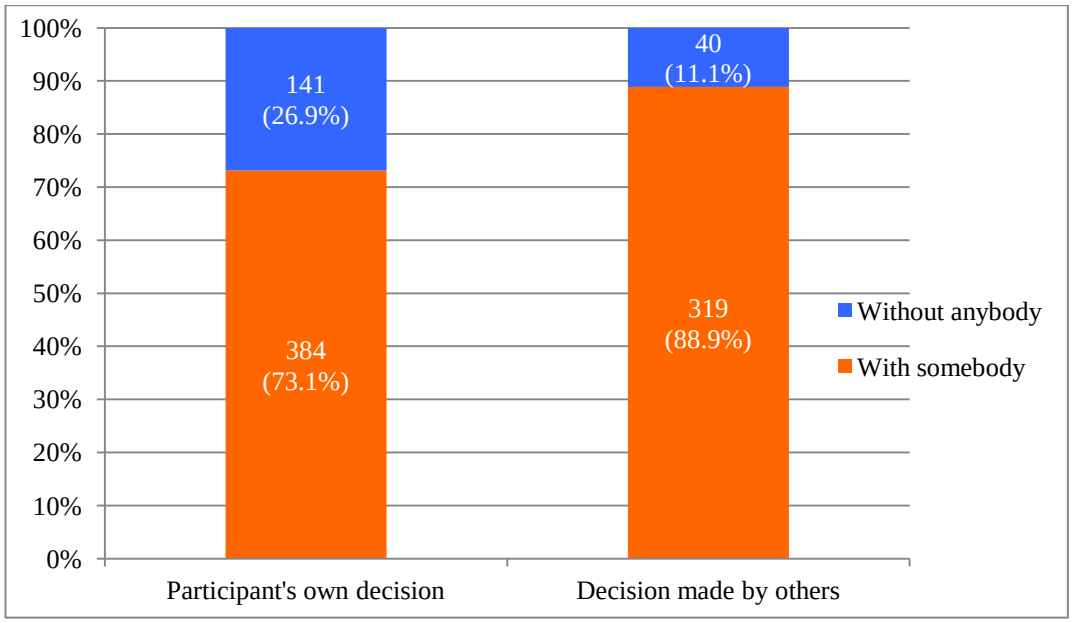


Figure 8.25 Arrival with or without somebody and the decision-maker variable

8.5.2.3 Analysis of the relationship between a patient's other health conditions and the decision made by participants or somebody else to use the emergency department

There was a significant association between patients' other health conditions and the decision-maker variable $\chi^2(1) = 7.6$; $p < 0.05$. Cramer's V correlation coefficient of 0.09, indicated a weak relationship between these two variables. As illustrated in Figure 8.26, the decision more often was made by others (11%) for patients who had additional health conditions. Accordingly, participants were more likely (8.5%) to make their own decision if a patient was presenting with only a single health problem.

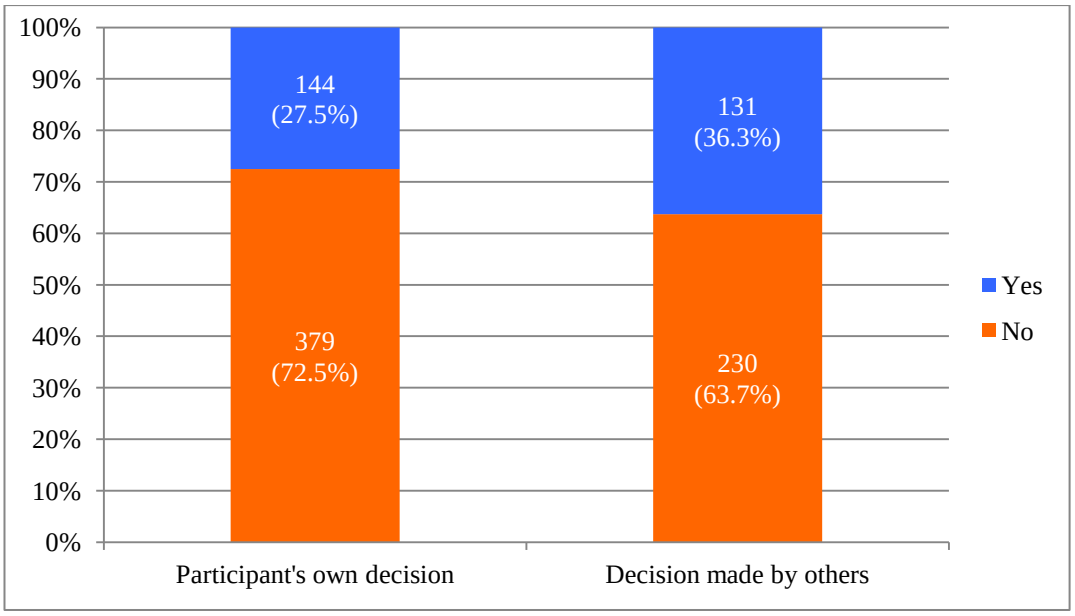


Figure 8.26 Patient's other health conditions and the decision-maker variable

8.5.2.4 Analysis of the relationship between contact made with somebody prior to coming and a decision made by participants or somebody else to use the emergency department

There was a significant association between contacting somebody prior to coming and the decision-maker variable $\chi^2(1) = 66.9$; $p < 0.05$. Cramer's V correlation coefficient of 0.27, indicated a moderate relationship between these two variables. Understandably, the decision was more often made for participants who contacted somebody prior to attending the emergency department than for participants who made their own decision (75% and 48 % respectively) as shown in Figure 8.27. It should be noted that over half of the participants (59%) attempted to contact somebody before making the decision to come to the emergency department.

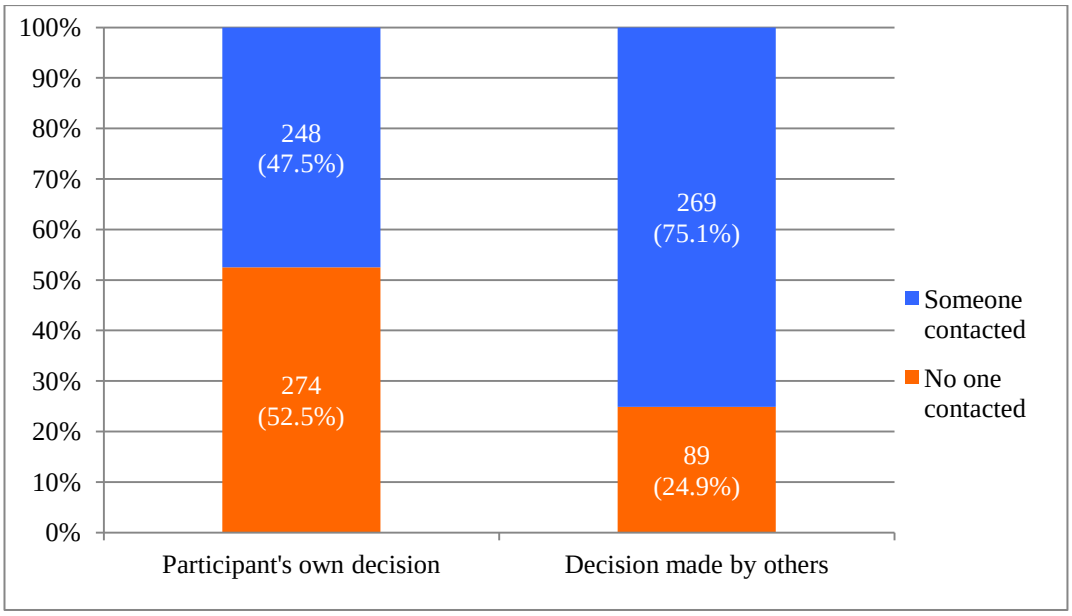


Figure 8.27 Contact made prior to coming and the decision-maker variable

8.5.2.5 Analysis of the relationship between a suggestion made by somebody prior to coming and a decision made by participants or somebody else to use the emergency department

There was a significant association between a suggestion made by others to participants regarding presenting to the emergency department and the decision-maker variable $\chi^2(1) = 141.8$; $p < 0.05$. Cramer's V correlation coefficient of 0.40, indicated a moderate relationship between these two variables. Interestingly, 78% of participants received such a suggestion from somebody before making the decision to come into the emergency department. The decision was made for participants who received a suggestion from somebody to come to the emergency department much more often than for those participants who made their own decision (99% and 65% respectively) as shown in Figure 8.28.

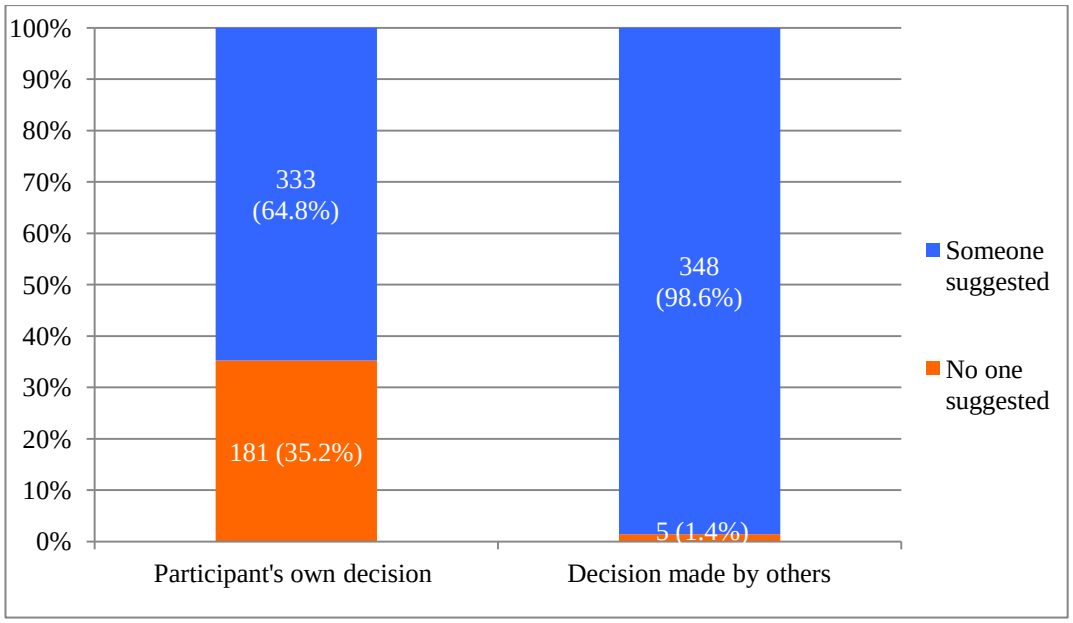


Figure 8.28 Suggestion made by someone to participants and the decision-maker variable

8.5.2.6 Analysis of the relationship between survey type and the decision made by participants or somebody else to use the emergency department

There was a significant association between the adult and parent/guardian surveys and the decision- maker variable $\chi^2(1) = 15.2$; $p < 0.05$. Cramer's V correlation coefficient of 0.13, indicated a weak relationship between these two variables. Participants who made their own decision to present to the emergency department were more often parents of a sick child than an adult patient (71% and 29% respectively) as shown in Figure 8.29.

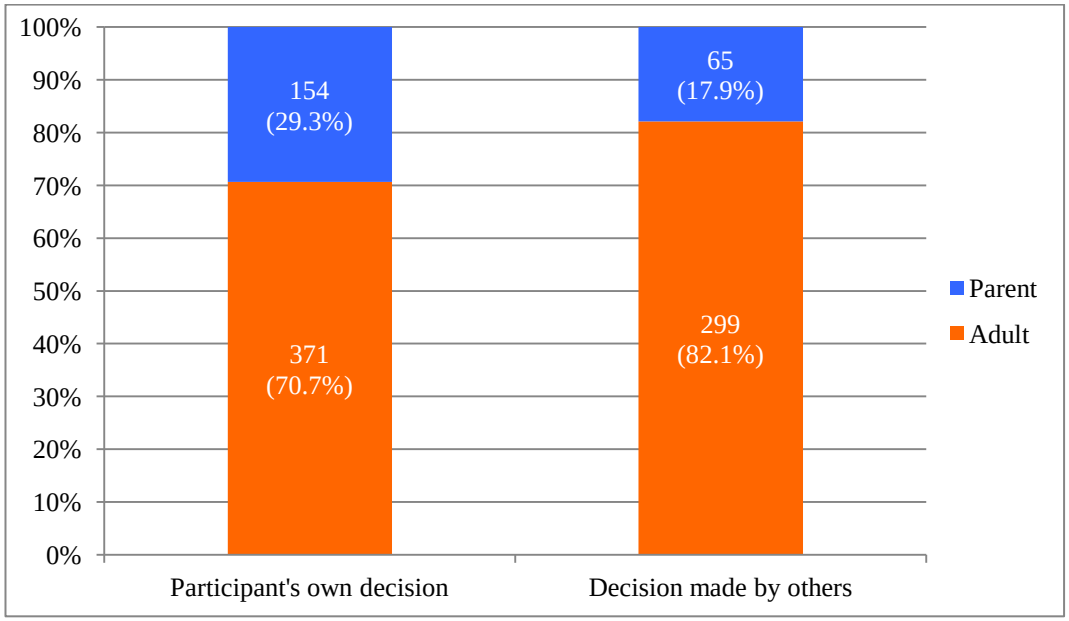


Figure 8.29 Survey type and the decision-maker variable

8.5.2.7 Summary of findings from Chi-square tests

The Chi-square analyses performed identified further differences between characteristics of the two groups of the emergency departments' participants as summarised in Table 8.18.

Table 8.18 Summary of characteristics based on Chi-square tests for the decision-maker variable

Participant's who made their own decision more likely:	*Participant's for whom the decision was made by others more likely:*
• made their decision to present to the emergency department at home; • arrived by themselves; • did not have other health conditions; • did not contact anybody and no suggestion was made to them; • were parents of a sick child.	• made a decision to present outside of their usual residence; • arrived accompanied by someone; • presented with additional health conditions; • contacted someone and received the suggestion to come; • were adult patients.

8.5.3 Results of the independent t-tests

Independent t-tests were performed between seven predicting variables and the outcome variable measuring the use of emergency departments by participants who made the decision to attend by themselves and patients for whom that decision was made by others. Table 8.19 shows the results of all tests performed and the tests that showed statistical significance are marked in bold.

Table 8.19 Summary of the independent t-tests results

	Participant's decision		Others decision						95% CI	
	Mean	SD[1]	Mean	SD[1]	Levene's test	t	df	P value	min	max
Age	**41.8**	**16.9**	**44.9**	**20.2**	**0.00**	**-2.40**	**841**	**0.013**	**-5.70**	**-0.66**
Condition related presentation	8.9	2.3	8.9	2.5	0.04	-0.53	788	0.594	-0.43	0.25
Best services at EDs	11.3	3.2	10.8	3.4	0.14	1.82	818	0.069	-0.33	0.88
Social support	35.6	6.2	35.4	6.4	0.65	0.43	792	0.670	-0.69	1.08
Self-efficacy	**21.9**	**4.1**	**21.1**	**4.7**	**0.08**	**2.88**	**801**	**0.004**	**0.29**	**1.52**
Perception of condition in the past	19.4	5.9	19.7	5.8	0.75	-0.59	859	0.554	-1.05	0.56
Perception of condition at present	16.2	6.0	16.3	6.5	0.11	-0.33	840	0.739	-1.00	0.71

[1] Standard deviation

Two out of seven tests reject the null hypothesis, as the means were statistically of significant difference. The details of these results are discussed individually below.

On average participants for whom the decision was made to come to the emergency department (Mean=44.9, SD=20.2) were older than participants who made that

decision for themselves (Mean=41.8, SD=16.3). This difference of, 3.1, 95% CI [-5.7, -0.7], was significant $t(841) = -2.40$; $p < 0.05$.

Accordingly, participants that were able to make their own decision received high scores, on average, (Mean=21.9, SD=4.1) on the self-efficacy scale and varied from the group of participants for whom somebody else made the decision to present to the emergency department (Mean=21.1, SD=4.7). The difference between the two groups, 0.8, 95% CI [0.29, 1.52], was significant $t(801) = 2.88$; $p < 0.05$.

8.5.3.1 Summary of findings from the independent t-tests

The independent t-test analyses identified further differences between characteristics of the two groups of emergency department patients. These are summarised in Table 8.20.

Table 8.20 Summary of characteristics based on the independent t-tests for the decision-maker variable

Participant's who made their own decision more likely:	*Participant's for whom the decision was made by others more likely:*
• were younger; • had higher levels of self efficacy.	• were older; • had lower levels of self efficacy.

8.5.4 Summary of findings from bivariate analyses

A number of significant relationships were found between the predicting and outcome variables based on the abovementioned analyses. In short:

- Participants who made their own decision to present to the emergency departments perceived their health problem as very urgent and wanted to be seen quickly but generally were healthier with no additional health problems.
- The decision was made for participants if they contacted somebody or were advised to come, were outside of their usual residence and arrived with an accompanying person.
- The decision was also made by others for older and adult patients, contrary to parents of children and people with high self-efficacy who often were able to make their own decision.

8.5.5 Logistic regression

In an effort to assess whether the potential factors predict the decision maker for the use of emergency departments, a binary logistic regression analysis was conducted. All 10 variables that had a relationship with the decision maker outcome variable in

the previous tests where included in the model. Only five of the predicting variables (suggestion and contact made prior to coming, place where decision was made, accompanied or not by other person, and survey type), however, made a unique statistically significant contribution to the model as shown in Table 8.21. The Pseudo R Square statistics indicated that the model as a whole explained between 25% (Cox and Snell R Square =.247) and 33% (Nagelkerke R Square =.334) of the variance in the decision makers. The strongest predictor for the decision maker variable was a suggestion made to the participants with an odds ratio of 21.7. This indicated that respondents who received a suggestion from someone were almost 22 times more likely to have that decision made for them as well, controlling for all other factors in the model. The second strongest predictor indicated that participants who made contact with somebody prior to coming were 2.7 times more likely to allow others to make that decision for them. The decision was made twice more likely for participants who were outside of their usual residence and for those who arrived accompanied by somebody to the hospital. The odds ratios were inversely associated with the survey type indicated that a parent or guardians of young patients half less likely to allow others to make a decision of their behalf.

Table 8.21 Logistic regression predicting likelihood of decision maker to the emergency departments

Predictor	**B**	**S.E.**	**OR**	**95% CI for OR**	**df**	**Sig**
Suggestion made	3.08	0.52	21.71	(7.79; 60.5)	1	0.000
Contact made prior to coming	0.98	0.19	2.678	(1.84; 3.89)	1	0.000
Place where decision was made	0.69	0.18	1.994	(1.40; 2.84)	1	0.000
Accompanied with or without somebody	0.65	0.25	1.918	(1.17; 3.15)	1	0.010
Survey type	-.077	0.22	0.461	(0.30; 0.71)	1	0.000

8.5.6 Summary of findings for decision maker outcome variable

There were a number of differences found between the two groups of decision makers. Some of them were associated with the nature of health problem and patients' age but in majority the differences were based on place where decision was made and people who were assisting in making such decision. The prediction analysis confirmed that contact with, suggestion by or presence of other people increases chances for a decision being made for patients. For parents there is a strong prediction of making their own decision where to present with a sick child.

8.6 SUMMARY OF RESULTS

In summary, this chapter applied statistical analyses to test relationships between all independent and moderating variables with three outcome variables as per the theoretical model. Statistically significant results were addressed through each section.

A number of important findings were established through the analyses. First, there were a number of factors that indicated a significant relationship between a participant's actual or perceived health status and their frequency of use and arrival method to the emergency departments. Second, affordability factors such as low income and being outside the workforce also indicated a significant relationship between the number of times patients present to the emergency department and the mode of transport they may have used. Third, self-efficacy for all three outcome variables played a significant role in decreasing the number of visits, reducing ambulance use and making their own decision as to where to seek care. Finally, the multivariable analyses retained a smaller number of factors that made a unique contribution to the predictive models and varied for each of the outcome variables. Self-efficacy, however, was the only factor that remained predictive for frequency of use and method of arrival to the emergency departments.

Significant findings and interpretations of established relationships within the construct of the hypothesised model will be discussed in the next chapter.

Chapter 9: Discussion

9.1 INTRODUCTION

This chapter discusses the key results related to the objectives of the two studies and examines key findings in the light of existing literature. The associated implications for policy and practice are outlined after each section. Subsequently, the strengths and limitations of this research are presented, followed by directions for future studies and final conclusions.

9.2 SUMMARY OF FINDINGS

A short summary of key findings from the two studies of this research project is presented as follows.

9.2.1 Findings of Study one

The utilisation rates for emergency department services in QLD were the highest for patients aged 85 and above. This was followed by the youngest group of patients (below 4 years old) who recorded the second highest utilisation rates. The lowest utilisation rates were observed for patients between 55 and 59 years old.

The average age of emergency department patients was 35.6 years. Men had higher utilisation rates for emergency departments in all age groups and were on average 1.3 years younger than females. The only group where the utilisation rate in women had exceeded men was in the 20-29 age group.

The majority of patients (91%) made the decision to come to an emergency department by themselves, a further 4% were referred by GPs, and 5% came directed from other services. Over one third of presenting patients referred to a hospital by GPs, were admitted to the respective hospital.

The vast majority of patients (81%) were triage category 3 and 4 on arrival. Almost 25% of patients attending emergency departments were admitted to hospital. Fourteen percent of admitted patients were triage category 4 or 5 on arrival.

An estimated 52% of patients attended emergency departments outside of business hours. This group of patients had similar triage assessments and outcomes and no

differences were found between the two groups of patients: those presenting during and outside of working hours.

Little variation was observed in presentations according to months of the year. There was an increase in attendance during weekends (Saturday through Monday morning) and during day time hours (10am and 7pm).

The largest group of patients suffered from injuries and poisoning and thus comprised 28% of the emergency department workload.

Twenty seven percent of patients were transported to an emergency department by ambulance, although a portion of high acuity patients (12% of patients triage category 1 and 46% patients triage category 2), came to an emergency department by their own means of transport.

Considerable attention has been paid publicly to emergency department performance criteria. Noticeably, 50% of all patients were treated within 33 minutes of arrival. Seven percent of patients did not wait to complete treatment, including 1.5% of patients assigned to triage category 1.

Patients from lower socioeconomic areas appeared to have higher utilisation rates. The utilisation rate for Indigenous people appeared to exceed those of European and other backgrounds. The utilisation rate for immigrants were generally less than that of Australian born patients.

Interestingly, only a small proportion of patients (12%) treated in emergency departments indicated having private health insurance despite the private health insurance community rate of 43% in QLD for the same year.

9.2.2 Findings of Study two

Patients who were generally sicker and had multiple or chronic conditions were more likely to use emergency department services repeatedly. The same groups were more often transported to the emergency departments by ambulance services, with the decision to present to an emergency department being made on their behalf.

Patients who believed their condition was urgent and serious made their own decision to come to an emergency department, presented multiple times, and used ambulance services as a mode of transport.

Patients more often used ambulance services and presented multiple times to emergency departments if they believed that emergency departments were the best place to seek care for their condition and perceived these facilities as the most convenient and accessible place.

Affordability factors, such as low income, unemployment, and Medicare insurance were only associated with repeated use of emergency department services and use of ambulance services as a mode of transport.

Patients generally reported a strong social and network support, although the lack of a spouse or living alone were associated with multiple uses of emergency department and ambulance services.

The majority of patients who repeatedly utilise emergency department and ambulance services, indicated that they sought care prior to coming to an emergency department by contacting someone (including medical professionals).

High levels of self-efficacy were found to be important factors for patients who made their own decisions where to seek care, the transport they used to come to an emergency department, together with reducing the number of times they presented to emergency departments.

The prediction of multiple uses of emergency departments related strongly to the perception of a patient own health status.

The prediction of ambulance use related to the perception of the seriousness of a patient's condition and contacting others prior to coming to an emergency department.

A high degree of self-efficacy was the only factor that predicted both a decrease in the number of presentations made to emergency departments and the utilisation of patients' own transport rather than ambulance services.

9.3 USERS OF EMERGENCY DEPARTMENTS

9.3.1 Socio-demographic factors

9.3.1.1 Age

An ageing population is often suggested as being the main factor causing the growth in demand for emergency department services in Australia and across the world, as

indicated earlier in the literature review (3.3.2). The current study, however, demonstrates that the elderly are not the only patients having high utilisation rates in Queensland. The second highest group of patients were children below four years of age. Further, a detailed examination of utilisation rates in Queensland confirms the growth in utilisation of emergency department services has occurred in all age groups (not just among the elderly), over the past eight years (Toloo et al., 2012). The age of patients was not found to be a significant factor contributing to multiple uses of emergency departments. Thus, with over one quarter of all presentations made to emergency departments in Queensland by paediatric patients and their high utilisation rates, the argument that elderly patients cause the demand for emergency department services is questionable. The impact placed by young patients on emergency departments could, however, be more characteristic for Australia than other western countries due to the higher natural growth rate (Index Mundi, 2013).

Further findings of this study showed that older patients were utilising ambulance services more often than younger patients, and the decision to present to emergency departments was more often made or imposed for elderly patients. It is important to note though that during 2012-2013, patients above 75 years old accounted for no more than 11.5% (and above 85 years old for 4.3%) of all presentations to emergency departments (AIHW, 2013). While this age group does not represent a large group of users, their needs differ to younger patients as they often have limited cognition and communication functions. The care provided to them consumes many resources of emergency departments and puts additional pressure on staff.

9.3.1.2 Gender

Similar to age, gender has not been found to be a significant factor contributing to the utilisation of emergency departments by multiple users, ambulance users or those who made their own decision to seek emergency care in a hospital. An examination of the impact caused by gender on the utilisation of emergency departments in the current study showed that males were in the majority in all age groups with the exception of one. Women aged between 20 and 29 had higher utilisation rates than males. Further investigations of ICD codes were performed within this age group to uncover possible reasons behind this situation. Injury and poisoning- related visits (group XIX of ICD codes) were the highest proportion among all presentations to emergency departments and interestingly also showed higher numbers for females than males in this age group.

The reasons behind this situation remains uncertain, however, recently emerging reports show the increasing prevalence of risk-taking behaviours among young women, notably in their use of alcohol and marijuana. The greatest proportion of recent use (40%) of illicit drugs was observed in 20 to 29 years old females (Carr-Gregg, Enderby, & Grover, 2003). Drinking venues are also attracting more women and 70% of young women report to having five or more drinks on one occasion, with 19% doing so on a weekly basis (Armstrong, Thunstrom, & Davey, 2011; Jonas, Dobson, & Brown, 2000). Similar findings come from studies across the globe suggesting that management strategies in emergency departments should be focused on patients with alcohol-related visits (Liu et al., 2013; Patton, 2013).

9.3.1.3 Ethnicity

An examination of ethnicity and its influence on the demand for emergency department services indicated that the Indigenous population had a higher utilisation rate in comparison to non-Indigenous Australians. Indigenous background was also found to be a significant factor for multiple presentations to emergency departments. These findings remain in accordance with previous studies which revealed that Indigenous patients more often sought medical assistance through the emergency departments (Costa, Sullivan, Walker, & Robinson, 2008; Thomas & Anderson, 2006). The contribution of the Indigenous population to the demand for emergency department services does not, however, seem considerable as they account for less than 6% of all yearly presentations.

Further analysis of utilisation rates in the current study showed that people born overseas had lower utilisation rates than Australian-born residents. One explanation, supported by other studies, would indicate that some migrants do not access acute care as they fear consequences based on previous experiences from their home countries (Sheikh et al., 2011).

Multiple presentations to emergency departments were, however, associated with people who had difficulties with communications in English. Lack of language proficiency may direct patients to seek care through emergency departments, which typically have better access to interpreters than doctors in primary care settings (Mahmoud & Hou, 2013; Philips, Remmen, De Paepe, Buylaert, & Van Royen, 2010).

The current study also revealed that recent migrants to Australia were more likely to arrive at an emergency department by their own transport. Similar findings were reported in a study from Sydney (Sheikh et al., 2011). The reasons behind lower utilisation of emergency services are complex and require further study. It is possible as migrants in emergency departments are a heterogeneous group, various cultural aspects may play different roles in people's behaviours and approaches to seeking care.

9.3.1.4 Economic factors

The current study established links between affordability factors and the demand for emergency department services. Patients who were out of the workforce and those whose weekly household income did not exceed $600, were more likely to use emergency department services more than once in the past six months. The same group also used the ambulance as a mode of transport to a hospital. These findings are in agreement with previous evidence that showed utilisation rates of emergency departments are higher amongst people from lower socioeconomic groups. Issues surrounding social inequality and access to affordable medical services are well-known across health care systems including Australia and other countries with or without universal insurance schemes (AIHW, 2006, 2010; Corrieri et al., 2010; Dubikaytis, Larivaara, Kuznetsova, & Hemminki, 2010; Nasr, Sivarajasingam, Jones, & Shepherd, 2010; The Allen Consulting Group, 2008; Toloo, FitzGerald, & Rego, 2011).

Additional findings indicated that patients who rely solely on the national health insurance scheme “Medicare” were more likely to attend the emergency department repeatedly over the six-month period. An examination of EDIS data showed that just over 12% of all patients treated in 2010-11 indicated having private health insurance. The numbers reported were higher for the cross-sectional study, where 31.2% of participants confirmed having private hospital cover. Both figures, however, are lower than official data which reports that 46% of the population have private hospital cover (ABS, 2013). Further, other reports demonstrate that about 6.5% of patients attended private emergency departments across Australia (AIHW, 2012). The reasons behind the lower utilisation for private emergency departments remain under-studied, although the additional costs associated with treatment at private emergency departments may play a part in decision-making processes for patients. This argument is further supported by another study suggesting that private, as

opposed to public, patients were more likely to be admitted to an inpatient unit in higher acuity triage categories (FitzGerald et al., 2013). Private hospitals often waived their emergency department fees if the patient was admitted to a hospital unit. As private emergency departments play an integral part in the emergency management system, further research should identify other potential factors that favour public over private emergency departments. The perception of a higher quality of care and organisational issues including the possibly limited capacity of private emergency departments should be investigated.

9.3.2 Implications for policy and practice

The findings discussed form the basis for future actions and development of policies. The large proportion of paediatric patients accessing emergency department services necessitate further investigation and management strategies which should be specifically tailored to this group of patients. The interventions should focus on health literacy and accurate education on paediatric illnesses and address common safety concerns, which would allow parents to assess acuity of their child's health issues. The proposed solutions should equip parents with the knowledge and skills that would allow them to care for their children in an out-of-hospital environment for as long as possible (Kubicek et al., 2012).

A complex and multiple needs of the elderly population presenting to emergency departments will require more specialist training in geriatric care for staff to recognise and provide them with appropriate treatment. There is scope for improvements, and careful scrutiny of current clinical practice and design of emergency departments should be undertaken to ensure not only suitable care but also to improve management strategies for the demand of emergency department services (Gray et al., 2013; Samaras, Chevalley, Samaras, & Gold, 2010; Shankar, Bhatia, & Schuur, 2013). Greater utilisation of ambulance services as a mode of transport to an emergency department by elderly patients also calls for specific interventions. Cheaper transport options should be investigated and implemented where appropriate for patients.

The burden placed on emergency departments by patients involved in injury and risk-taking behaviours, including the consumption of alcohol and use of illegal substances, calls for separate strategies. Firstly, these issues need to be addressed at the core of the problem within the community and should involve implementations of widespread multipronged prevention programs. The proposed interventions, however, should also

utilise the "teachable moment" posed by attendance to the emergency department that may assist in a reduction of patients presenting with injuries or drug and alcohol related visits.

Different strategies should be considered to provide other options for treatment to decrease the number of patients in emergency departments from lower socio-economic groups in Australia. These patients generally believe that hospital care is more affordable. Understanding the possible cultural factors is also imperative in order to enhance equal access and quality of care for newly arrived and short-term residents in Australia. Any proposed intervention for these groups of patients may be geographically sensitive and greatly varied due to a high degree of heterogeneity of acute care system delivery across regions. A number of studies found consistent evidence that emergency department cost-sharing successfully reduces its utilisation (Morgan, Chang, Alqatari, & Pines, 2013). These findings, however, came mainly from countries where health care provision is covered by private insurance which differs from state-funded universal health coverage systems employed in other developed countries. Generally, however, to generate system-wide savings, it is important to make outpatient services more appealing to low socio-economic groups of patients by addressing their concerns surrounding cost, quality, and accessibility (Grande, Barg, Carter, Long, & Shannon, 2014). One possible strategy might also include a reduction of health system barriers such as the complicated referral systems that are often required for seeing specialists. Additional effort should concentrate on finding or creating a number of new pathways to enter hospital care. The design and functioning of emergency healthcare system in the future should also be considered (FitzGerald, Toloo & Romeo, 2014).

Under-utilisation of private emergency departments seems especially important, as a greater number of patients accessing emergency departments throughout the private network could assist in decreasing the demand in the public sector (FitzGerald et al, 2013). Future studies investigating possible factors behind this situation are necessary before any changes can be proposed.

9.4 PERSPECTIVE OF PATIENTS

9.4.1 Perceived priority

The perspective of patients regarding the severity, urgency, and seriousness of their presenting conditions has been indicated as an important factor by a number of studies as discussed earlier in the literature review. Various findings from the current study are also consistent with these views. Patients who perceived their condition as serious, either at the time of making the decision or while asked at the emergency departments, were more likely to use emergency department and ambulance services repeatedly over the six-month period. Further, the perception of seriousness of the health problem was a strong predictor for using the ambulance as a mean of transport to an emergency department. Additionally, close to 35% of patients in the study sample perceived their condition as very urgent and believed that they should be seen within 10 minutes of their arrival. The perceived priority by patients themselves and actual triage category assigned to them differed in the current study, similar to previous reports (Kamali, Jain, Jain, & Schneider, 2013; Richards & Ferrall, 1999; Sanders, 2000; Siminski et al., 2005). Even though it is difficult to find agreement between the perception of urgent needs felt by patients and professionals, the trend analysis of QLD data interestingly showed an increase in more urgent triage categories and a decline in categories 4 and 5. Further, the overall admission rates increased by 3% over the six-year period with a decline by nearly 5% for patients in triage category 1 and 2, and an increase rate of 0.7% for patients in triage category 5 (Toloo et al., 2012). Moreover, close to 15% of patients admitted to hospital in 2010-11 were assigned triage category 4 or 5 on arrival.

9.4.2 Health status

These figures lead to other findings from the current study, which examined the health status of individuals. Patients with chronic health condition and additional health issues to the presenting problem, were found to be more likely to use emergency department services multiple times and come by ambulance. The decision was more likely made more by others to seek care in an emergency department, particularly if the patient had multiple health problems. In fact, the strongest predictor for multiple use of emergency departments was the existence of additional health problems and the chronic nature of the condition. The examination of diagnoses of patients given to them at the point of discharge from emergency

departments in 2010-11, showed that the largest group of presentations (28%) related to injury and poisoning. These are, by their nature, unexpected events and should be treated by the acute health system. These findings strongly support the view that patients access emergency department services when they perceive their illness as serious and urgent and they are concerned about their own well-being. These facts remain consistent with studies across the globe (Hunter et al., 2013; Kamali et al., 2013; Khan, Glazier, Moineddin, & Schull, 2011). This is further supported by recent population-based surveys of patients where almost half of the respondents indicated that they felt their condition was serious or life-threatening and therefore came to an emergency department (ABS, 2013). Patients also seek urgent care if they have multiple health problems and are aware of the complexity of their current health status. They subsequently require extensive medical assessment, and often admission to hospital.

9.4.3 Preferences

Not only perception of their own health but also a strong belief of quality of care provided by an emergency department services directs people with acute illnesses, an acute exacerbation of a chronic illness, or with other medical problems to seek care in a hospital. The results showed that the second largest group of presentations (13.6%) after injury and poisoning according to ICD codes, related to a wide group of factors influencing health status. Almost three quarters of patients within this group were assigned low urgency triage categories (4 and 5), and, interestingly, over 40% did not wait for treatment to commence or finish. The majority of patients within this group entered emergency departments for specific procedures, follow-up examinations after treatment, or examinations and observations for other reasons than suspected diseases and conditions. This shows that patients, who also access emergency departments for characteristically non-urgent conditions, believe that emergency departments offer better care, including better specialised staff, for their particular condition and have the required equipment and facilities to deal better with the situation. Those patients were found to be more likely to come to emergency departments repeatedly. These views are strongly confirmed by other studies, which agree that patients behaved as rational consumers. They are well informed about alternative facilities and services. Indeed, it is not unusual for the patients to contact someone before presenting to an emergency department. They inevitably choose an

emergency department as the most suitable place and the most efficient provider that can meet their health needs (Durand et al., 2012; Elbelb & Schlesinger, 2009).

All the above arguments strongly support the view that patients categorised as low acuity in emergency departments are not necessarily inappropriate patients. Any proposed changes to the current system would have to take into account these perspectives together with the reasons why patients choose to attend the emergency department. Simply increasing the access to primary community care will not change care-seeking behaviour if patients prefer or feel that their current conditions should be treated in a hospital setting.

9.4.4 Implications for policy and practice

The above findings point towards a very important issue that requires careful consideration when proposing any management strategies. It is apparent that the most difficult group of patients to redirect from emergency departments are those who truly believe that their condition is serious, urgent, and even life-threatening, and therefore come to seek care through the acute system in a hospital. Their beliefs were steadily formed for the past years by different health promotion and awareness activities. For these types of patients, emergency departments are the most appropriate places for care. Proposed strategies could include greater patient education, which can be inexpensive and might also contribute towards improving health literacy (Morgan et al., 2013). Further study, however, into specific educational materials or even the implementation of new technology-based solutions are needed. Education of the general public could be very difficult to achieve whilst assuring safety for patients at the same time. Some authors suggest, however, that educational interventions are more effective and should be introduced as a part of a multi-faceted process together with the management of specific chronic conditions (Flores-Mateo, Violan-Fors, Carrillo-Santisteve, Peiró, & Argimon, 2012).

9.5 FACTORS INFLUENCING USE OF EMERGENCY DEPARTMENTS

9.5.1 Perceived cost, barriers, and benefits

Actions taken by patients and decisions where to seek medical care are influenced by their own perception of costs, barriers, and benefits. It is believed that one of the barriers contributing to the growth in attendance at emergency departments is the lack of access to primary care providers. Indeed, a detailed examination of EDIS data

in the current study showed an increase in the number of visits made from Saturdays to the early morning hours on Mondays. Categorisation of the urgency of patients showed slightly more patients receiving triage category 4 than category 3, although categories 1 and 2 do not change much according to the day of the week. A fairly even distribution of presentations was observed throughout the year thus indicating a lack of variation according to seasons. The hourly pattern of arrivals of patients to emergency departments showed a peak by 10am which is sustained until 7pm and declines through to 5am. Presentations to a hospital during business hours are possibly caused by the lack of available same-day or chosen date appointments in primary care offices. This resonates with recent survey findings among Australian patients, where over a quarter of respondents said they could not get an appointment with their GP at the time or on the day they needed it and waiting times were lengthy (ABS, 2013). Further, the current study established significant links between multiple users and primary care providers. People who repeatedly come to an emergency department, were more likely to consider using GP services, but nevertheless presented to emergency departments when they could not get an appointment. This is also confirmed by the survey where close to a quarter of patients felt that the care they needed could have been provided by a GP (ABS, 2013). Evidence from previous studies support the view that higher utilisation over the weekend is linked to less access to GPs during that time, and, in general terms the growth in emergency department attendance has been concurrent with a decline in GP numbers in Australia (Durand et al., 2012; Gentile et al., 2010; Milbrett & Halm, 2009).

Previous studies have implied that accessibility and convenience factors, including free services offered by public emergency departments in Australia, open access, and one-stop shops, contribute to the utilisation of emergency departments (Abernethie & Nagree, 2004; Masso, Bezzina, Siminski, Middleton, & Eagar, 2007; Sempere-Selva, Peiro, Sendra-Pina, Martínez-Espín, & López-Aguilera, 1999). These suggestions, however, have not been significantly associated with higher utilisation rates by any groups of patients in the current study.

9.5.2 Cues to action

EDIS data showed that over 4% of patients were referred to emergency departments by GPs, with an additional 4.6% being referred by other health and public services.

Similarly, 6.7% of Australian patient-respondents, said they were sent to an emergency department by a GP (ABS, 2013). Further examination of actions taken by patients prior to presentations to an emergency department revealed that almost 60% of patients contacted someone (including health professionals) and 80% of surveyed patients admitted receiving suggestions from others to present to emergency departments. The current study also revealed that patients who sought assistance from others were more likely to arrive by ambulance and the decision was made on their behalf. In fact, patients who contacted someone or received such a suggestion from others were much more likely to have had that decision made for them. These results underline an interesting issue. The decision of patients to come to an emergency department is either largely made for them by others or very often influenced by other people or sources whom they contacted. This is also confirmed by another study, where almost half of the patients sought care on the advice of a family member, friend, or health care provider (Lobachova et al., 2014). Health promotion activities together with the increasing availability of health articles on the Internet seem to supplement not only the knowledge of patients but also their expectations regarding treatment. Patients in these situations behave according to the advice they have received or read.

9.5.3 Social support

A lack of social support in general as well as living alone and living without a spouse has been indicated by previous studies as a contributing factor to higher utilisation of emergency department services (Geller, Janson, McGovern, & Valdini, 1999; Hastings et al., 2008; Moore, Gerdtz, Hepworth, & Manias, 2011). The examination of different aspects of social support, in the current study, found that multiple users were indeed more likely to present to an emergency department if they did not have a spouse or partner. People living alone also more likely arrived to the hospital by ambulance, unaccompanied, and made their own decision to present to an emergency department. Respondents in the current study, however, generally felt strong social support and this factor was not found to predict a higher use of emergency department services. These findings do not in fact support the view that social isolation or lack of social support are overall significant factors contributing to the demand for emergency department services as suggested by others (Carret, Fassa, & Kawachi, 2007; Marco, Weiner, Ream, Lumbrezer, & Karanovic, 2010). The

existence of strong community support networks and high resilience among communities, however, could be unique to Australia and in particular to Queensland. Recent flood and cyclone disasters, like those experienced in 2011, and repeated exposure to natural events, render people more resilient and engender a sense of support within a community (Boom, 2014; Community Resilience in Queensland, 2014; Hegney et al., 2007).

9.5.4 Implications for policy and practice

The abovementioned factors emphasise that issues surrounding the provision of primary and out-of-hours care need to be carefully re-examined. The strategies looking at the provision of alternative care facilities should be properly planned and directed to regions where the expansion of primary care is needed. The increase number of GPs should be targeted to specific areas and during times where there is an identified deficit of these services. Additional capacity in areas already served by large numbers of primary care facilities can potentially have the opposite effect due to issues relating to supply-induced demand (Morgan et al., 2013). Furthermore, changes should be made at the operational level of GP clinics to enable their capacity to fit in unscheduled patients who are seeking urgent but not emergency medical assistance for their condition. A number of factors from the current studies indicated that users of emergency departments often present with conditions related to injuries and poisoning including alcohol and drug consumption. Additionally, emergency department users suffer from multiple and chronic diseases. The needs of these types of patients should be addressed firstly in the community and the proposed strategies should therefore concentrate on services that could provide sufficient care for these groups of patients before they enter emergency departments. Moreover, primary care physicians should be able to perform specific tasks and spend more time on intensive activities such as counselling and prevention which are so essential in the management of complex, mental health, and multiple conditions (Gentile et al., 2010, FitzGerald & Toloo, 2013).

Another important finding from this study shows clearly that many patients seek advice or information before presenting to an emergency department. A careful re-examination of currently existing advisory and information services is required, as their effectiveness remains questionable or at least does not truly decrease the number of presentations to emergency departments. Future interventions should also

include the use of external resources, such as the internet, where patients often seek information and guidance prior to presentation to an emergency department. The internet is a powerful educational tool and interactions with patients looking for assistance online should be explored and implemented (Boucher, 2010; Sechrest, 2010).

Additionally, efforts should also concentrate on increasing the capacity elsewhere in the system in ways that are acceptable to patients and enhance the coordination between emergency departments and other facilities. Universal issues surrounding the rising demand for emergency departments also point toward a re-examination of the current scope of care and services that are and could potentially be provided by emergency departments (Flores-Mateo et al., 2012).

9.6 SELF-EFFICACY

The self-efficacy concept has been understudied within the context of emergency department services, despite the critical role it appears to play in the initiation and maintenance of behavioural change. The current study incorporated this notion based on a developed theoretical framework as discussed in Chapter 4. The general self-efficacy scale was used in the current study, as it predicts how well people cope with daily hassles and their ability to adapt after experiencing unexpected and various stressful life events (Luszczynska & Schwarzer, 2005). The findings indicated that lower levels of self-efficacy were associated with multiple presentations to emergency departments over the six-month period as well as the utilisation of ambulance services as a mode of transport. Additionally, the decision was made on behalf of participants with lower degrees of self-efficacy. This implies that reasons behind presentations to emergency departments were associated, to some degree, with difficulties experienced by patients in solving unexpected problems and dealing effectively with emergency events. Interestingly, self-efficacy was the only factor that remained predictive for multiple use and the method of arrival to the emergency departments. Patients with higher scores on the self-efficacy scale showed a decrease in the probability of presenting to the emergency departments together with the use of ambulance services. This concept will be very important to take into account and investigate further as high levels of self-efficacy gives people a personal sense of control and facilitates a change of health behaviour. It also influences the effort individuals invest in changing their actions and supports short- and long-term success

(DeVellis & DeVellis, 2000). Low self-efficacy is found to be a source of anxiety, which in the context of the current findings, would contribute to a greater utilisation of emergency department and ambulance services (Strecher, DeVellis, Becker, & Rosenstock, 1986). In addition, the concept of self-efficacy is established to be a crucial factor in health behaviour change and maintenance. This includes the management of chronic diseases, increase of healthy behaviours, improvement of physical activities, and changing of unhealthy behaviours including smoking and drinking (Christiansen, Vik, & Jarchow, 2002; Gwaltney et al., 2002; Lorig et al., 1996; Resnicow et al., 2000). Thus, increased levels of self-efficacy would provide patients with the necessary skills and coping mechanisms, even in unexpected circumstances and with diminished levels of concern, to manage better their condition out of the hospital environment.

9.6.1 Implications for policy and practice

The above discussion strongly asserts that the self-efficacy concept should be taken seriously into account in future strategies aiming to reduce the utilisation of emergency department services. Increased levels of patients' self-efficacy will additionally have the potential to reduce the number of visits and times the ambulance is used by different groups of users.

The methods of enhancing self-efficacy include education, as individuals have the capacity to learn, acquire new skills, and improve their understanding. A greater personal belief in their capacity to perform a particular task, even in the event of unexpected illness, will allow patients to seek appropriate care, although not necessarily through emergency departments. Developing an awareness of specific situations where efficacy may be low, and rehearsing desired behaviours in these situations appears to enhance efficacy and will also assist in managing patients' conditions outside of hospital (Lorig et al., 2001).

Other strategies include greater counselling from a credible source, as this may be effectively used to generalise specific task-related efficacy expectations to other behaviours. Additional methods of enhancing efficacy include relaxation training to reduce anxiety for patients not able to cope with difficult situations and their concerns.

All the above methods of increasing self-efficacy are not easily applicable to the general population, although, as discussed, they are effective and sustainable.

Further studies are required to inform the most appropriate methods for increasing self-efficacy and to tailor them to specific groups of users.

9.7 SUMMARY OF DISCUSSION

The findings of this study echoed previous research, particularly in the areas of the perspective of patients and their reasons behind presentations to emergency departments. The main factors, contributing to the choice made by patients, penetrate into the individuals' perception of their own health condition particularly with regard to the severity and urgency of the current medical problem. Moreover, patients seek care if they feel their condition is too complex or they have additional health problems which cannot be dealt with, in their opinion, outside of hospital. Indeed, patients perceive emergency departments as the best place to seek care. This is due firstly to their belief that emergency departments provide better specialised staff and adequately equipped facilities, and also because it is accessible, convenient, and affordable for them in their current situations. Thus, they cannot be considered inappropriate users as they truly believe they have a right and should be treated in a hospital environment. There is no evidence from the current study supporting the view that the elderly population is responsible for the rising demand for emergency department services in Queensland, especially considering paediatric patients constitute a large proportion of presentations. The lack of social support also has not been found to contribute to rising demand as the majority of patients felt they received enough support through social and community networks. Financial burdens and lack of access to primary care has been found to play some role in directing people to emergency departments. It is, however, not a general trend or the sole reason behind the situation but rather selective circumstances where lack of appointments contribute to a proportion of visits that could potentially be provided in out-of-hospital-care. Finally, the current study established that self-efficacy has been an important factor in individuals' ability to deal with unexpected events and in explaining the reasons behind presentations to or avoidance of emergency departments.

Furthermore, given the range of factors identified in this study, it is evident that 'blaming' patients for inappropriate use of acute health care systems is too simplistic explanation for the increasing demand on emergency departments. Instead, any

proposed interventions to decrease the demand for emergency department services, must fully comprehend these factors and reasons of patients in order to be successful.

In light of the current study findings, it seems reasonable to conclude that neither single nor simple solutions can be introduced that would take the pressure off emergency departments. Factors contributing to the increased number of visits to emergency departments are multiple and complex. Therefore, various strategies should be deployed to assist in the management of the demand.

All proposed changes in health care policies require rigorous evaluation before being implemented and should also be tested with patients. It is important to ensure that new solutions are acceptable for patients and will be utilised by them. Broad organisational changes should include a careful multi-layered approach integrating several interventions that are tailored to specific groups of users and their needs. Such interventions should be aimed at redirecting as many patients as possible from each group of users. Potentially, even a small reduction in the number of visits made by users from different groups will contribute to an overall decrease in the utilisation of emergency department services. The strategies should also be introduced along with a feedback mechanism to monitor outcomes and adverse events. The redirection of patients from emergency departments should most importantly improve outcomes and enhance value rather than simply turn people away. The wrong strategies can have a high impact on individual health and the use of health care resources. Therefore, all efforts should concentrate on ensuring that patients will obtain the right care in the right place and at the right time.

9.8 STRENGTHS AND LIMITATIONS

A number of strengths as well as limitations have to be acknowledged for this research project in relation to study design, implementation, data sample, the generalisation of the study findings, and the proposed theoretical model.

9.8.1 Generalisability of study findings

The study findings are arguably quite generalisable to participants of emergency department services in QLD for the following reasons:

- the study achieved a good response rate of 67% from the total population of patients in emergency departments at a given point of time;
- the comparisons between the study sample and completed EDIS data over a one year period in terms of age, gender, and transport to emergency departments was not very different;
- a close percentage of presentations according to geographical location, hospital size, and type was achieved.

The above qualities probably decrease the selection bias of the study and sustain a reasonable level of confidence in the generalisability of the findings.

9.8.2 Data sources, study design and implementation

Analyses performed for study one were based on EDIS data collected only from reporting hospitals which did not cover data from about a quarter of emergency departments in QLD. Additionally, the accuracy of some of the variables such as employment status, insurance status, language, and country of birth remained questionable due to the large amount of missing data or doubtful composition of data distribution. All missing data, however, was verified and appropriate statistical techniques or data limitations applied have been acknowledged throughout the analyses.

A cross-sectional study has been employed to examine the perspectives of patients and their use of emergency department services. As it was an appropriate method to use, some of the surveys constructed were measured retrospectively and thus such a study design does not allow the establishment of any causal relationships. Questions in the questionnaire were based on self-reporting, which is a commonly used method for collecting data about an individual's health, although it may have affected the accuracy of answers as patients may not have remembered exactly their reasons or feelings in the past. This potentially brings to the fore the recall and reporting bias (Newell, Girgis, Saanson-Fisher, & Savolainen, 1999). A prospective study design for this project could have addressed some of these concerns, although given the fact and as per definition that emergency department visits are unpredictable and unplanned, this would require additional resources which were not available for this project.

Although every reasonable effort was made to include all patients in the study sample, 15% of all patients attending the emergency departments during the data collection phase were not able to be approached for various reasons. Among them, there were groups of

patients that needed to be excluded from participation due to serious physical or mental conditions, those who were considered dangerous to be approached, children not accompanied by legal guardians, and patients who did not speak English. A further 33% of patients refused to or were not able to participate in the study. The comparison with EDIS data demonstrated, however, a satisfactory representation of patients according to their demographic characteristics such as gender and age, which decreases the possibility of a bias in the study sample. It was also suggested that the distribution of adult and children participating in the study sample was not too different from EDIS data. Some bias may have been imposed in the sample due to these exclusions and thus the results need to be interpreted with due consideration of this limitation.

Further, the collected data for study two came from a sample of hospitals selected based on convenience, as demonstrated by their preparedness to be involved. Budget, time, logistics, and ethical clearance procedures further restricted the number of hospitals involved in the study. Additionally, data was collected only during three months of the year and night shifts were not included in the sample. Also, the exclusion of patients who were seriously sick and therefore not able to participate in the survey study, brought an imbalance in the study sample between patients with higher and lower urgency categories. There is, however, an agreement that high urgency patients are rightful users of emergency department services and their reasons behind presentations are seen as appropriate. The main focus of international debates has been on lower acuity patients, who are well-represented in the current study and whose perspectives have been carefully studied as an important focus of this study.

The participants included were only those who presented to emergency departments. Possible factors preventing people from entering emergency departments, have not been studied and remained outside the scope of this study.

It also should be noted that the study was conducted based only on patients attending public emergency departments in Queensland. Private hospital emergency departments and those from other states and territories remained outside of the scope of this research project and thus the findings cannot necessarily be projected across Australia.

9.8.3 Conceptual model of emergency department services use

The present study reviewed and applied existing models and theories of health behaviour and utilisation of health care services to develop a theoretical model of emergency department services users. The proposed framework guided this research

to understand the impact of multi-faceted factors and the use of emergency department services. It provided an overall picture of the complex factors pertaining to the use of emergency department services.

This framework was especially useful for sifting through large numbers of potential factors to determine those which had contributed to the utilisation of emergency department services, as there were no previous studies which could pre-specified importance and level of impact caused by each of the factors. Further studies, however, should be employed to understand more explicitly the relationships and impact of the moderating and individual factors. Its appropriateness also needs to be considered in terms of different health care systems and study settings. More empirical studies are also required to test such theoretical frameworks.

In order to capture the full range of health service utilisation behaviours, a multi-method study needs to be considered if possible. For example, qualitative and quantitative approaches to data collection can be combined with other methods such as telephone follow-up interviews and focus groups, as different methods of data collection often produce different results (Dillman, Smyth, & Christian, 2008).

In addition, assessment of the factors influencing the use of emergency department services was derived from the perspectives of patients. Self-reported data were used. Nevertheless, due to the possible lack of precision of self-reports, strategies need to be considered that can maximise the accuracy of such data. In addition, the scales measuring the perceptions, attitudes, and beliefs of patients were assessed as factorially valid, even if some of them need to be further developed to ensure their greater internal reliability. Other more direct measures could be applied further to evaluate all individual and system-wide factors.

9.9 CONCLUSIONS AND RECOMMENDATIONS FOR FURTHER STUDIES

The above study confirms that factors contributing to the rising demand for emergency department services in Queensland are multiple and complex. This is further corroborated by the perspectives of examined users, which are a heterogeneous group. Four major conclusions can be drawn from the present study. Firstly, no evidence was found to support the view that inappropriate use causes a growth in demand for emergency department services. In fact, patients presenting to

emergency departments were fully aware of alternative services, although they made their informed decision to seek care through the acute system based on the perception of their own health status and beliefs that emergency departments are the most suitable places to address their current health needs. Secondly, a growing and ageing population cannot be exclusively blamed for the growing demand, as utilisation rates are rising within all age groups and are high among paediatric patients. Further, no single group of patients was found to contribute significantly to the demand for emergency department services. Thirdly, some of the organisational issues pertaining to the availability of alternative services at certain points of time, as well as various social factors including the low socio-economic status of patients, were linked and contributed to a higher amount of patients seeking care in emergency departments. Fourthly, as the self-efficacy concept was found to be an important factor, it should be incorporated into the planned management strategies.

The study findings indicate clearly that no single solution or strategy will effectively assist in the management of demand for services provided by the emergency department networks throughout Queensland. In fact, any proposed management policy ideas should bear in mind complex and multi-factorial issues causing the current situation.

Future research in different states and territories is needed to obtain a broad picture of the utilisation of emergency department services. More empirical studies are required to test the theoretical framework for understating health-seeking behaviours among emergency department services users. A similar study should also be performed amongst non-users and users of private emergency departments in order to understand and determine factors affecting their decision-making processes. Studies surrounding proposed strategies based on currently available information are needed in conjunction with patients. Comprehensive studies among all components of health and acute care systems will assist in identifying and implementing management strategies. These in return, will contribute to the reduction of the constantly growing demand for emergency department services and provide safe and satisfactory health care services for patients in need.

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Appendices

Appendix A: Patients Information Sheet

PARTICIPANT INFORMATION for QUT RESEARCH PROJECT

"Demand for Emergency Health Services in Queensland"

Description

The purpose of this project is to examine the extent of demand for emergency health services in Queensland, including ambulance and hospital emergency departments. The findings of the project will help improve health services and reduce crowding of the emergency departments and ambulances.

This project is being undertaken as part of a research grant which also includes Ph.D. requirements for Mrs Joanna Rego. The project is funded by the Australian Research Council and Queensland Ambulance Services. The funding body will not have access to the data obtained during the project.

For this purpose, we would like to know how patients utilise emergency health services; and what other resources can be made available to reduce the crowding of the services.

The research team invites you to participate as it is important to understand and involve the views of patients and their carers in addressing the problems of our health system.

Participation and withdrawal

The project is conducted in several major hospitals in Queensland and you are randomly selected to participate.

Your participation in this study is completely voluntary and you are free to withdraw from this study at any time without prejudice or penalty. However, since the questionnaire is anonymous, you may not be able to withdraw once you have submitted the questionnaire. Your decision to participate will in no way impact upon your current or future relationship with QUT, the hospital or ambulance services.

What is involved?

Your participation will involve completing the attached questionnaire. It takes approximately 10-15 minutes, however you can stop completing the questionnaire at any time. It is preferred if you can fill it in here at the hospital and return it to the project officer.

However if it is not possible, you can opt to take it home and send the completed questionnaire via post to the research team. Please ask the project officer for a "postage paid" return envelope.

Expected benefits

It is expected that this project will not benefit you directly right now. However, it may benefit the people of Queensland in the long term by reducing the crowding of hospitals and ambulance services and improving health standards.

Are there any risks?

Participation in this study should not involve any physical or mental discomfort, or risks beyond those of everyday living.

Confidentiality

All data collected in this study will be confidential. Only members of the research team will have access to identified data, and any personal data you provide will be recorded and stored separately from your questionnaire responses. All data will be coded in a de-identified manner and subsequently analysed and reported in such a way that responses will not be able to be linked to any individual. The data you provide will only be used for the specific research purposes of this study.

Consent to Participate

The return of the completed questionnaire is accepted as an indication of your consent to participate in this project.

Questions / further information about the project

Please contact the research team members named below to have any questions answered or if you require further information about the project.

Concerns / complaints regarding the conduct of the project

QUT is committed to researcher integrity and the ethical conduct of research projects. However, if you do have any concerns or complaints about the ethical conduct of the project you may contact the QUT Research Ethics Officer on 3138 2340 or ethicscontact@qut.edu.au. The Research Ethics Officer is not connected with the research project and can facilitate a resolution to your concern in an impartial manner.

Thank you for taking part in this study, your contribution is greatly appreciated.

Research Team Contacts		
Professor Gerry FitzGerald	Dr Sam Toloo	Mrs Joanna Rego
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Appendix B: Patients Consent Form

CONSENT FORM for QUT RESEARCH PROJECT

"Demand for Emergency Health Services in Queensland"

Statement of Adult Consent

By signing below, you are indicating that you:

- have read and understood the information document regarding this project
- have had any questions answered to your satisfaction
- understand that if you have any additional questions you can contact the research team
- understand that you are free to withdraw at any time, without comment or penalty
- understand that you can contact the Research Ethics Officer on 3138 2340 or ethicscontact@qut.edu.au if you have concerns about the ethical conduct of the project
- agree to participate in the project
- for projects involving minors: have discussed the project with your child and their requirements if participating

Participant's Name _____

Signature _____

Date _____ / _____ / _____

Statement of Child Consent

Your parent or guardian has given their permission for you to be involved in this research project. This form is to seek your agreement to be involved.

By signing below, you are indicating that you:

- have read or have had read to you in your first language, and you understood the Participant Information Sheet
- have freely agreed to participate in this project according to the conditions in the Participant Information Sheet
- were informed you will be given a copy of the Participant Information Sheet to keep;

Participant' Name _____

Signature _____

Date _____ / _____ / _____

Name of Witness _____

Signature .....

Date ..... / ..... / .....

Researcher's Name .....

Signature .....

Date ..... / ..... / .....

Appendix C: HREC QLD Ethics approval for Study one

Queensland Health Central Office Human Research Ethics Committee

Enquiries to:
Phone: 07 323 59452
Fax: 07 3405 6131
E-mail regu@health.qld.gov.au

22 September 2010

Prof Gerard FitzGerald
School of Public Health, QUT Kelvin Grove
Victoria Park Rd
Kelvin Grove QLD 4059

Dear Prof FitzGerald

HREC Reference number: HREC/10/QHC/40

Project title: Emergency Health Services (EHS): Demand and Service Delivery Models

Thank you for submitting the above project for ethical and scientific review. This project was considered by the QldHealth - Central Office Committee Human Research Ethics Committee (HREC) on 20 September 2010.

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007)* and the *CPMP/ICH Note for Guidance on Good Clinical Practice*. Attached is the HREC Composition with specialty and Hospital affiliation.

I am pleased to advise that the Committee has granted approval of this research project. HREC approval is valid to 30 September 2013.

Please note the following conditions of approval:

1. The Principal Investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including:
    a. Unforeseen events that might affect continued ethical acceptability of the project.
    b. Serious Adverse Events must be notified to the Committee as soon as possible.

    In addition the Investigator must provide a summary of the adverse events, in the specified format, including a comment as to suspected causality and whether changes are required to the Patient Information and Consent Form. In the case of Serious Adverse Events occurring at the local site, a full report is required from the Principal Investigator, including duration of treatment and outcome of event.

2. Amendments to the research project which may affect the ongoing ethical acceptability of a project must be submitted to the HREC for review. Major amendments should be reflected in a revised online NEAF (accompanied by all relevant updated documentation and a cover letter from the principal investigator, providing a brief description of the changes, the rationale for the changes, and their implications for the ongoing conduct of the study). Hard copies of the revised NEAF, the cover letter and all relevant updated documents with tracked changes must also be submitted to the HREC coordinator as per standard HREC SOP. Further advice on submitting amendments is available from http://www.health.qld.gov.au/ohmr/html/regu/regu_home.asp

3. Amendments to the research project which only affect the ongoing site acceptability of the project are not required to be submitted to the HREC for review. These amendment requests should be submitted directly to the Research Governance Office/r (by-passing the HREC).
4. Proposed amendments to the research project which may affect both the ethical acceptability and site suitability of the project must be submitted firstly to the HREC for review and, once HREC approval has been granted, then submitted to the RGO.
5. Amendments which do not affect either the ethical acceptability or site acceptability of the project (e.g. typographical errors) should be submitted in hard copy to the HREC coordinator. These should include a cover letter from the principal investigator providing a brief description of the changes and the rationale for the changes, and accompanied by all relevant updated documents with tracked changes.
6. The HREC will be notified, giving reasons, if the project is discontinued at a site before the expected date of completion.
7. The Principal Investigator will provide an annual report to the HREC and at completion of the study in the specified format.
8. The District administration and the Human Research Ethics Committee may inquire into the conduct of any research or purported research, whether

approved or not and regardless of the source of funding, being conducted on hospital premises or claiming any association with the Hospital; or which the Committee has approved if conducted outside [name] Hospital Health Service District.

Should you have any queries about the consideration of your project please contact the Research Ethics and Governance Unit. The HREC terms of Reference, Standard Operating Procedures, membership and standard forms are available from http://www.health.qld.gov.au/ohmr/html/regu/regu_home.asp

Please complete a Site Specific Assessment (SSA) Form for this study and send it to regu@health.qld.gov.au. This is required to complete the final authorisation.
Once authorisation to conduct the research has been granted, please complete the Commencement Form and return to the office of the Human Research Ethics Committee.

The HREC wishes you every success in your research.
Yours faithfully
Professor Mervyn Eadie
CHAIR
HUMAN RESEARCH ETHICS COMMITTEE
CENTRES FOR HEALTHCARE IMPROVEMENT

Appendix D: QUT Ethics approval for Study one

-----Original Message-----

From: Research Ethics [mailto:ethicscontact@qut.edu.au]

Sent: Tuesday, 16 November 2010 3:02 PM

To: Gerard Fitzgerald; JOANNA REGO; Kirsten McKenzie

Cc: Janette Lamb

Subject: Ethics Application Approval -- 1000001131

Dear Prof Gerard Fitzgerald

Project Title:

Emergency Health Services (EHS): Demand and service delivery models (Phase 2)

Approval Number: 1000001131

Clearance Until: 20/02/2011

Ethics Category: Human

This email is to advise that your application has been reviewed by the Chair, University Human Research Ethics Committee and confirmed as meeting the requirements of the National Statement on Ethical Conduct in Human Research. We note ethics clearance has already been

obtained from another institution.

***PLEASE NOTE:

Please ensure that any concerns or complaints in relation to the study that are reported to the PCH Executive Officer, Research and Ethics, are also promptly reported to the QUT Research Ethics Unit.

***

Whilst the data collection of your project has received ethical clearance, the decision to commence and authority to commence may be dependent on factors beyond the remit of the ethics review process. For example, your research may need ethics clearance from other organisations or permissions from other organisations to access staff. Therefore the proposed data collection should not commence until you have satisfied these requirements.

If you require a formal approval certificate, please respond via reply email and one will be issued.

This project has been awarded ethical clearance until 20/02/2011 and a progress report must be submitted for an active ethical clearance at least once every twelve months.

Researchers who fail to submit an appropriate progress report may have their ethical clearance revoked and/or the ethical clearances of other projects suspended. When your project has been completed please advise us by email at your earliest convenience.

For variations, please ensure that approval has been sought from the lead university before completing and submit the QUT online variation form:

http://www.research.qut.edu.au/ethics/forms/hum/var/variation.jsp

Please do not hesitate to contact the unit if you have any queries.

Regards

Janette Lamb on behalf of the Chair UHREC

Research Ethics Unit | Office of Research

Level 4 | 88 Musk Avenue | Kelvin Grove

p: +61 7 3138 5123

e: ethicscontact@qut.edu.au

w: http://www.research.qut.edu.au/ethics/

Appendix E: HREC QLD Ethics approval for Study two

Queensland Government

Queensland Health

Professor Gerry Fitzgerald
School of Health
Queensland University of Technology
Victoria Park Road
KELVIN GROVE QLD 4059

Human Research Ethics Committee
The Prince Charles Hospital
Metro North Health Service District
Rode Road,
Chermside QLD 4032

Enquiries to: Jacqui_Hayward@health.qld.gov.au
Philip_Lee@health.qld.gov.au
Office Ph: (07) 3139 4691
(07) 3139 4500
Fax: (07) 3139 6907
Our Ref: PL/JH/Final Approval

Date: 31 August 2010

Dear Prof Fitzgerald,

RE: **HREC/10/QPCH/98: Emergency Health Services (EHS): Demand and Service Delivery Models: G. Fitzgerald; S. Toloo; J. Rego.**

The Committee would like to congratulate you and your research team for your prompt and considered responses to the committee's concerns in the above project for further ethical and scientific review. The documents submitted were considered by Metro North - The Prince Charles Hospital Human Research Ethics Committee (HREC) at its meeting on the 26 August 2010.

This HREC is constituted and operates in accordance with the National Health and Medical Research Council's (NHMRC) *National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007)* and the *CPMP/ICH Note for Guidance on Good Clinical Practice*.

Based on the detailed information submitted, I am pleased to advise that the Human Research Ethics Committee has granted final approval for this research project. However, the Committee would like to iterate that the research team needs to exercise due consideration in its outcome analysis towards systemic bias against high acuity patients presenting at ED. The documents reviewed and approved at the meeting include:

Document	*Version*	*Date*
Patient Information Sheet/Consent Form	2	11 August 2010
Patient Information Sheet/Consent Form: Consent for participation in the study for adult patients, parents of children presenting to EDs and children age 15 - 18 years old.	2	11 August 2010
Patient Information Sheet/Consent Form: Consent for to obtain additional information from EDIS and for follow up studies - focus groups	2	11 August 2010
Questionnaire: Questionnaire for parents or guardians	2	11 August 2010

Office: The Prince Charles Hospital | Postal: Rode Road Chermside Q 4032 | Phone: (07) 3139 4500/3139 4691 | Fax: (07) 3139 6907

Questionnaire: Questionnaire for adults patients	2	11 August 2010
Questionnaire: Short questionnaire for decision makers	2	11 August 2010
Investigator's Brochure: Brochure about the QEHS research project		
HREC ethics approval for the previous stage of this research project.		04 August 2009
Letter from Sponsor: Agreement between ARC, QAS & QUT supporting the project. The research proposal was reviewed by reviewers in these organisations.		10 March 2008
Protocol	2	11 August 2010

Please note the following conditions of approval:

1. The Principal Investigator will immediately report anything which might warrant review of ethical approval of the project in the specified format, including:

    a. Unforeseen events that might affect continued ethical acceptability of the project. Serious Adverse Events must be notified to the Committee as soon as possible. In addition the Investigator must provide a summary of the adverse events, in the specified format, including a comment as to suspected causality and whether changes are required to the Patient Information and Consent Form. In the case of Serious Adverse Events occurring at the local site, a full report is required from the Principal Investigator, including duration of treatment and outcome of event.

2. Amendments to the research project which may affect the ongoing ethical acceptability of a project must be submitted to the HREC for review. Major amendments should be reflected in a revised online NEAF (accompanied by all relevant updated documentation and a cover letter from the principal investigator, providing a brief description of the changes, the rationale for the changes, and their implications for the ongoing conduct of the study). Hard copies of the revised NEAF, the cover letter and all relevant updated documents with tracked changes must also be submitted to the HREC coordinator as per standard HREC SOP. Further advice on submitting amendments is available from http://www.health.qld.gov.au/ohmr/html/regu/regu_home.asp

3. Amendments to the research project which only affect the ongoing site acceptability of the project are not required to be submitted to the HREC for review. These amendment requests should be submitted directly to the Research Governance Office/r (by-passing the HREC).

4. Proposed amendments to the research project which may affect both the ethical acceptability and site suitability of the project must be submitted firstly the HREC for review and, once HREC approval has been granted, then submitted to the RGO.

5. Amendments which do not affect either the ethical acceptability or site acceptability of the project (e.g. typographical errors) should be submitted in hard copy to the HREC coordinator. These should include a cover letter from the principal investigator providing a brief description of the changes and the rationale for the changes, and accompanied by all relevant updated documents with tracked changes.

6. The HREC will be notified, giving reasons, if the project is discontinued at a site before the expected date of completion.

7. The Principal Investigator will provide an annual report to the HREC and at completion of the study in the specified format.

8. The District administration and the Human Research Ethics Committee may inquire into the conduct of any research or purported research, whether approved or not and regardless of the source of funding, being conducted on hospital premises or claiming any association with the Hospital; or which the Committee has approved if conducted outside The Prince Charles Hospital Health Service District.

HREC approval is valid for **2 years** from the date of this letter.

Should you have any queries about the HREC's consideration of your project please contact Jacqui Hayward or myself on the above phone numbers or email addresses. The HREC terms of Reference, Standard Operating Procedures, membership and standard forms are available from http://www.health.qld.gov.au/ohmr/html/regu/regu_home.asp

You are reminded that this letter constitutes ethical approval only. **You must not commence this research project at a site until separate authorisation from the District CEO or Delegate of that site has been obtained.**

A copy of this approval must be submitted to the District Research Governance Officer/Delegated Personnel with a completed Site Specific Assessment (SSA) Form for authorisation from the CEO or Delegate to conduct this research at The Prince Charles Hospital Health Service District.

Once authorisation to conduct the research has been granted, please complete the Commencement Form http://www.health.qld.gov.au/northside/documents/form_notification and return to the office of the Human Research Ethics Committee.

The HREC wishes you every success in your research.

Yours faithfully

Philip Lee
for
Dr Russell Denman
CHAIR
HUMAN RESEARCH ETHICS COMMITTEE
METRO NORTH HEALTH SERVICE DISTRICT

Appendix F: Mater Children's Hospital HREC Ethics approval for Study two

From: Peter Coxeter [pcoxeter@mmri.mater.org.au] on behalf of Research Ethics [research.ethics@mmri.mater.org.au]
Sent: Friday, 17 December 2010 10:26 AM
To: Joanna Rego
Subject: 1621AC - Emergency Health Services (EHS): Demand and Service Delivery Models

Dear Joanna,

1621AC - Emergency Health Services (EHS): Demand and Service Delivery Models

I write to advise that the Mater Health Services Human Research Ethics Committee has granted ethical approval for your research proposal. Please accept our very best wishes for the success of this study. In all future correspondence with the Committee please quote the Mater reference number. A formal confirmation letter will be forwarded to you shortly.

The Committee at this time would like to offer you every success for the outcome of the study.

Kind regards, Peter

Peter Coxeter

Research Ethics Coordinator

Mater Medical Research Institute
Rm 57 Level 3 Quarters Building||Annerley Road||Woolloongabba||Qld 4102
t: (07) 3163 1585 e: pcoxeter@mmri.mater.org.au

f: (07) 3163 1571 w: www.mmri.mater.org.au

Appendix G: QUT Ethics approval for Study two

-----Original Message-----
From: Research Ethics [mailto:ethicscontact@qut.edu.au]
Sent: Tuesday, 16 November 2010 3:02 PM
To: Gerard Fitzgerald; JOANNA REGO; Kirsten McKenzie
Cc: Janette Lamb
Subject: Ethics Application Approval -- 1000001131
Dear Prof Gerard Fitzgerald
Project Title:
Emergency Health Services (EHS): Demand and service delivery models (Phase 2)
Approval Number: 1000001131
Clearance Until: 20/02/2011
Ethics Category: Human

This email is to advise that your application has been reviewed by the Chair, University Human Research Ethics Committee and confirmed as meeting the requirements of the National Statement on Ethical Conduct in Human Research. We note ethics clearance has already been obtained from another institution.
***PLEASE NOTE:
Please ensure that any concerns or complaints in relation to the study that are reported to the PCH Executive Officer, Research and Ethics, are also promptly reported to the QUT Research Ethics Unit.
***
Whilst the data collection of your project has received ethical clearance, the decision to commence and authority to commence may be dependent on factors beyond the remit of the ethics review process. For example, your research may need ethics clearance from other organisations or permissions from other organisations to access staff. Therefore the proposed data collection should not commence until you have satisfied these requirements.
If you require a formal approval certificate, please respond via reply email and one will be issued.
This project has been awarded ethical clearance until 20/02/2011 and a progress report must be submitted for an active ethical clearance at least once every twelve months.
Researchers who fail to submit an appropriate progress report may have their ethical clearance revoked and/or the ethical clearances of other projects suspended. When your project has been completed please advise us by email at your earliest convenience.
For variations, please ensure that approval has been sought from the lead university before completing and submit the QUT online variation form:
http://www.research.qut.edu.au/ethics/forms/hum/var/variation.jsp

Please do not hesitate to contact the unit if you have any queries.
Regards
Janette Lamb on behalf of the Chair UHREC
Research Ethics Unit | Office of Research
Level 4 | 88 Musk Avenue | Kelvin Grove
p: +61 7 3138 5123
e: ethicscontact@qut.edu.au
w: http://www.research.qut.edu.au/ethics/

Appendix H: Permissions to use copyright protected materials

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Original Wiley figure/table number(s)	Table 1. Gross number of ED occasions of service in Australian public hospitals: 2000–2001 to 2009–2010; Figure 1. ED presentations per 1000 persons in Australian public hospitals: 2000–2001 to 2009–2010.; Table 2. Growth in ED presentations per

1000 persons in Australian public hospitals: 2000–2001 to 2009–2010

Permission for Table 1.2

From: Gerard Fitzgerald
Sent: Tuesday, 13 May 2014 5:32 PM
To: Joanna Rego
Subject: RE: Permission request

Dear Joanna

As I am currently overseas and have no easy access to a scanner, I provide the following email as approval of your right to use the material.

I Gerard Joseph FitzGerald agree to permit the non-exclusive licence for an indefinite period to include the above materials for which I am copyright owner, into your thesis for inclusion in QUT ePrints.
Professor of Public Health, QUT
13th May 2014.
Gerry FitzGerald

Professor Gerry FitzGerald MD, FACEM, FRACMA, FCHSM Director, Centre for Emergency and Disaster Management School of Public Health, Queensland University of Technology Victoria Park Road, Kelvin Grove Qld 4059 Mobile 0439 772383 Phone +61 7 31383935 email gj.fitzgerald@qut.edu.au

From: Joanna Rego
Sent: Tuesday, 13 May 2014 3:57 PM
To: Gerard Fitzgerald
Subject: Permission request

Dear Professor FitzGerald,

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I _____ agree to permit the non-exclusive licence for an indefinite period to include the above materials for which I am copyright owner, into your thesis for inclusion in QUT ePrints.

Position
Date

Yours sincerely,

Joanna Rego
Ph.D. Candidate
Queensland University of Technology
School of Public Health and Social Work
Victoria Park Road
Kelvin Grove QLD 4059 Australia
ph: 0450 117 707
email. j.rego@qut.edu.au

Permission for Figure 2.1

From: Wilson, Phoebe [Phoebe.Wilson@oup.com]
Sent: Thursday, 31 October 2013 9:14 AM
To: Joanna Rego
Subject: FW: Permission request

Dear Joanna

I have checked this figure and am able to grant permission for you to include figure 3.2 Simplified flow of health funds int he domestic sector from page 48 of The Australian Health Care System by Duckett and Willcox (2011).

Please ensure the figure is appropriately acknowledged.

Kind Regards

Phoebe Wilson

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Original Wiley figure/table number(s)	Figure 3.1. Health Belief Model Components and Linkages (page 49)
Will you be translating?	No

Permission for Figure 4.2

Subject: Permission request

From: Willcox, Emma - Chichester [ewillcox@wiley.com]
Sent: Wednesday, 30 October 2013 1:36 AM
To: Joanna Rego
Subject: FW: Permission request

Dear Joanna Rego,

Thank you for your request.

Permission is granted for you to use the material requested for your thesis/dissertation subject to the usual acknowledgements and on the understanding that you will reapply for permission if you wish to distribute or publish your thesis/dissertation commercially.

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Emma Willcox
Permissions Assistant
WILEY

From: Joanna Rego [mailto:j.rego@qut.edu.au]
Sent: 22 October 2013 03:29
To: Permission Requests - UK
Subject: Permission request 22 October 2013

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Please sign below if you agree.

I _____ agree to permit the non-exclusive licence for an indefinite period to include the above materials for which I am copyright owner, into your thesis for inclusion in QUT ePrints.

Position

Date

Yours sincerely,

Joanna Rego
Ph.D. Candidate
Queensland University of Technology
School of Public Health and Social Work
Victoria Park Road
Kelvin Grove QLD 4059 Australia
ph: 0450 117 707
email. j.rego@qut.edu.au

Appendix I: Demand for Emergency Health Services in Queensland Adult Questionnaire

Attached below.

Appendix J: Demand for Emergency Health Services in Queensland Parent/Guardian Questionnaire

Attached below.

Demand for Emergency Health Services in Queensland

ADULT QUESTIONNAIRE

1 What is the main problem you have come to the hospital for today?

2 When did this problem start?

1 ○ Today
2 ○ Less than a week ago
3 ○ More than a week ago
4 ○ It is a chronic/ long term condition

3 Where were you when you made the decision to come to hospital about this problem?

1 ○ At home
2 ○ At work
3 ○ In a public place
4 ○ Other, please specify...

4 Were you with somebody when you made the decision to come to hospital about this problem?

1 ○ No, I was by myself
2 ○ Yes, with my family/friends
3 ○ Yes, with my colleagues
4 ○ There were other people and passers-by
5 ○ Other, please specify...

5 How serious did you think the condition was at the time you decided to come to the hospital?

1	2	3	4	5	6	7	8	9	10

Not serious at all — Very serious

6 How serious do you think the condition is now?

1	2	3	4	5	6	7	8	9	10

Not serious at all — Very serious

7 How urgent did you think the condition was at the time you decided to come to the hospital?

1	2	3	4	5	6	7	8	9	10

Not urgent at all — Very urgent

8 How urgent do you think the condition is now?

1	2	3	4	5	6	7	8	9	10

Not urgent at all — Very urgent

9 How much pain did you feel at the time you decided to come to the hospital?

1	2	3	4	5	6	7	8	9	10

No pain at all — Pain as bad as it gets

10 How much pain do you feel now?

1	2	3	4	5	6	7	8	9	10

No pain at all — Pain as bad as it gets

11 Do you have other conditions for which you need medical care?

1 ○ Yes
2 ○ No

12 Apart from current condition, overall would you say your health is:

1 ○ Excellent
2 ○ Very good
3 ○ Good
4 ○ Fair
5 ○ Poor

13 Not counting this time, how many times have you attended a hospital emergency department during the past six months?

1 ○ 0
2 ○ 1
3 ○ 2
4 ○ 3
5 ○ More than 3, please specify...

14 Considering your condition prior to commencement of treatment what priority do you think you should be given?

1 ○ Priority 1 (immediately)
2 ○ Priority 2 (within 10 minutes)
3 ○ Priority 3 (within 30 minutes)
4 ○ Priority 4 (within 1 hour)
5 ○ Priority 5 (within 2 hours)
6 ○ Other, please specify...

15 Did you contact anybody about your condition before coming to the hospital? Select all that apply.

1 ☐ No one
2 ☐ My GP
3 ☐ Ambulance
4 ☐ Contacted 13HEALTH
5 ☐ Other, please specify...

16 Who suggested you to come to the hospital? Select all that apply.

1. ☐ No one
2. ☐ My GP suggested
3. ☐ Ambulance staff suggested
4. ☐ I called 13HEALTH and they suggested
5. ☐ My family or friends suggested
6. ☐ People at work suggested
7. ☐ Others suggested, please specify...

17 Who made the decision for you to come to the hospital?

1. ○ It was my own decision
2. ○ My GP decided
3. ○ Ambulance staff decided
4. ○ I called 13HEALTH and they decided
5. ○ My family or friends decided
6. ○ People at work decided
7. ○ Others decided, please specify...

18 Here are some reasons people have mentioned about why they went to the hospital. Please indicate the extent to which you considered each of these reasons for coming to the hospital today.

		1 Yes, Considered it to a great extent	2 Considered it to some extent	3 Did not consider it
a	Hospital is open at all times.	○ 1	○ 2	○ 3
b	I needed immediate (urgent) care.	○ 1	○ 2	○ 3
c	No other health services or GP were available at the time.	○ 1	○ 2	○ 3
d	It's convenient to have all facilities in one place in the hospital.	○ 1	○ 2	○ 3
e	Hospital services are free.	○ 1	○ 2	○ 3
f	My condition was too severe to go elsewhere.	○ 1	○ 2	○ 3
g	Hospital doctors and nurses are better specialised.	○ 1	○ 2	○ 3
h	GPs charge an extra fee.	○ 1	○ 2	○ 3

18	1 Yes, Considered it to a great extent	2 Considered it to some extent	3 Did not consider it
i	The hospital is close to where I am.	O 1	O 2 O 3
j	Because the hospital provides better care for my condition.	O 1	O 2 O 3
k	Other options were not as suitable as the hospital for my problem.	O 1	O 2 O 3
l	Other reasons, please specify...		

19 Here are a few general statements about hospital emergency departments. We are interested in your opinion about these. Please indicate to what extent you agree or disagree with each statement.

	1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
a	People should go to hospital only if it's urgent or life-threatening.	O 1	O 2	O 3	O 4 O 5
b	The only places available to patients after hours are hospitals.	O 1	O 2	O 3	O 4 O 5
c	Hospitals have the convenience of having all facilities in one place.	O 1	O 2	O 3	O 4 O 5
d	With free services in the hospitals why should patients go elsewhere?	O 1	O 2	O 3	O 4 O 5
e	Hospital doctors and nurses are better specialised.	O 1	O 2	O 3	O 4 O 5
f	If GPs bulk-billed, people wouldn't come to the hospital in the first place.	O 1	O 2	O 3	O 4 O 5
g	People I know have mostly had a good experience with their hospital.	O 1	O 2	O 3	O 4 O 5
h	People wouldn't come to the hospital if they had other practitioners nearby.	O 1	O 2	O 3	O 4 O 5

19	1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
i	Even if you go to a GP or other health services, they refer you to the hospital.	O 1	O 2	O 3	O 4	O 5
j	People can't afford to take time off from work to go to a doctor during the day.	O 1	O 2	O 3	O 4	O 5
k	People would use after hours GP or super clinics even if they didn't bulk-bill.	O 1	O 2	O 3	O 4	O 5
l	It's worth the waiting, even when the hospital is crowded.	O 1	O 2	O 3	O 4	O 5
m	Waiting in the hospital is better than paying an extra fee to the GP.	O 1	O 2	O 3	O 4	O 5
n	Everyone is entitled to free medical services regardless how serious their illness is.	O 1	O 2	O 3	O 4	O 5
o	Coming to the hospital for non-urgent illnesses is a misuse of the health system.	O 1	O 2	O 3	O 4	O 5

In this section we would like to ask a few demographic questions about you.
It will help us study a wide range of people from all groups in our society.

20 Are you male or female?

1 O Male
2 O Female

21 What year were you born?

22 Who do you live with?

1 O Alone
2 O With my partner/spouse
3 O With my partner/spouse and child/children
4 O With my child/children
5 O With others, please specify...

23	Apart from Medicare do you have any other insurance? Select all that apply.	1 ☐ No 2 ☐ Private insurance 3 ☐ Travel insurance 4 ☐ Veterans Affair 5 ☐ Other 6 ☐ I do not have Medicare
24	In which country were you born?	1 ○ Australia 2 ○ Other, please specify...
25	If you were born overseas, in what year did you first arrive in Australia to live here for one year or more?	☐☐☐☐
26	How well do you speak English?	1 ○ English is my native language 2 ○ Almost like a native speaker 3 ○ Communicate without problems 4 ○ With some difficulties 5 ○ With great difficulties 6 ○ I do not speak English
27	How did you arrive at the hospital today?	1 ○ By ambulance (road or air) 2 ○ By your own car 3 ○ Police 4 ○ Family/friend car 5 ○ Taxi 6 ○ Public transport 7 ○ Others, please specify...

If you did not arrive by ambulance please go to Question #32.

28	How long did you have to wait for the ambulance to arrive after the request was made?	1 ○ Less than 10 minutes 2 ○ 11 – 30 minutes 3 ○ 31 minutes to 1 hour 4 ○ More than 1 hour but less than 2 hours 5 ○ More than 2 hours 6 ○ I don't know

29 Who suggested you to come by ambulance? Select all that apply.

7 ☐ No one
8 ☐ My GP suggested
9 ☐ I called 13HEALTH and they suggested
10 ☐ My family or friends suggested
11 ☐ People at work suggested
12 ☐ Others suggested, please specify...

30 Who made the decision for you to come by ambulance?

13 ○ It was my own decision
14 ○ My GP decided
15 ○ I called 13HEALTH and they decided
16 ○ My family or friends decided
17 ○ People at work decided
18 ○ Others decided, please specify...

31 Here are some reasons people have mentioned about why they used the ambulance. Please indicate the extent to which you considered each of these reasons for coming to the hospital by ambulance today.

		1 Yes, Considered it to a great extent	**2** Considered it to some extent	**3** Did not consider it
a	My condition was too severe to use other means of transport.	○ 1	○ 2	○ 3
b	We thought I would get higher priority in the hospital if I arrived by ambulance.	○ 1	○ 2	○ 3
c	There wasn't a car available to drive me to the hospital.	○ 1	○ 2	○ 3
d	Nobody was there to drive me to the hospital.	○ 1	○ 2	○ 3
e	I couldn't afford to pay a taxi to bring me to the hospital.	○ 1	○ 2	○ 3
f	It was safer to come by ambulance.	○ 1	○ 2	○ 3
g	I required special care during transport.	○ 1	○ 2	○ 3
h	I needed immediate (urgent) care.	○ 1	○ 2	○ 3

31	1 Yes, Considered it to a great extent	2 Considered it to some extent	3 Did not consider it
i	Because it did not cost me an extra fee to use ambulance.	○ 1	○ 2 ○ 3
j	Other options were not as suitable as the ambulance for my problem.	○ 1	○ 2 ○ 3
k	Other, please specify...		

Perception of Ambulance Services. Please answer even if you did not arrive by ambulance.

32 **Not** counting this time, how many times have you used an ambulance during the past six months?

1 ○ 0
2 ○ 1
3 ○ 2
4 ○ 3
5 ○ More than 3, please specify...

33 Here are a few general statements about hospital emergency departments. We are interested in your opinion about these. Please indicate to what extent you agree or disagree with each statement.

	1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
a	Ambulance is for everyone to use when they feel unwell.	○ 1	○ 2	○ 3	○ 4 ○ 5
b	Patients get a higher priority in the hospital if they arrive in an ambulance.	○ 1	○ 2	○ 3	○ 4 ○ 5
c	People should be able to use the ambulance if they can't afford a taxi no matter how critical their condition is.	○ 1	○ 2	○ 3	○ 4 ○ 5
d	People should use the ambulance if they can't access other means of transport regardless of the seriousness of their condition.	○ 1	○ 2	○ 3	○ 4 ○ 5

33	1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
e	People would still use an ambulance even if they had to pay an extra fee.	○ 1	○ 2	○ 3	○ 4	○ 5
f	People should call the ambulance only if it's an emergency or urgent situation.	○ 1	○ 2	○ 3	○ 4	○ 5
g	Everyone is entitled to free ambulance services regardless how serious their illness is.	○ 1	○ 2	○ 3	○ 4	○ 5
h	Using an ambulance for non-emergency conditions is a misuse of the system.	○ 1	○ 2	○ 3	○ 4	○ 5

34 **Social Support** — Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and mark the column that is closest to your situation.

	1 As much as I would like	2 Almost as much as I would like	3 Some, but would like more	4 Less than I would like	5 Much less than I would like
a	I have people who care what happens to me.	○ 1	○ 2	○ 3	○ 4	○ 5
b	I get love and affection.	○ 1	○ 2	○ 3	○ 4	○ 5
c	I get chances to talk to someone about problems at work or with my housework.	○ 1	○ 2	○ 3	○ 4	○ 5
d	I get chances to talk to someone I trust about my personal or family problems.	○ 1	○ 2	○ 3	○ 4	○ 5
e	I get chances to talk about money matters.	○ 1	○ 2	○ 3	○ 4	○ 5
f	I get invitations to go out and do things with other people.	○ 1	○ 2	○ 3	○ 4	○ 5

34	1 As much as I would like	2 Almost as much as I would like	3 Some, but would like more	4 Less than I would like	5 Much less than I would like
g	I get useful advice about important things in life.	○ 1	○ 2	○ 3	○ 4	○ 5
h	I get help when I am sick in bed.	○ 1	○ 2	○ 3	○ 4	○ 5

35 Please indicate how you feel about each of the following statements.

	1 Not true at all	2 Hardly true	3 Moderately true	4 Exactly true
a	I can always manage to solve difficult problems if I try hard enough.	○ 1	○ 2	○ 3	○ 4
b	If someone opposes me, I can find the means and ways to get what I want.	○ 1	○ 2	○ 3	○ 4
c	It is easy for me to stick to my aims and accomplish my goals.	○ 1	○ 2	○ 3	○ 4
d	I am confident that I could deal efficiently with unexpected events.	○ 1	○ 2	○ 3	○ 4
e	I can solve most problems if I invest the necessary effort.	○ 1	○ 2	○ 3	○ 4
f	If I am in trouble, I can usually think of a solution.	○ 1	○ 2	○ 3	○ 4
g	I can usually handle whatever comes my way.	○ 1	○ 2	○ 3	○ 4

The information in this section will help us understand the views of different groups. Your information will remain confidential and will not be disclosed to anyone outside the research team.

36 What is your present marital status?

1 ○ Married
2 ○ Never married
3 ○ Widowed
4 ○ Divorced
5 ○ Separated but not divorced
6 ○ De facto relationship
7 ○ Not applicable

37	Are you of Aboriginal or Torres Strait Islander origin?	1 ○ No 2 ○ Yes, Aboriginal 3 ○ Yes, Torres Strait Islander 4 ○ Yes, both Aboriginal and Torres Strait Islander
38	Where do you usually live?	1 ○ I live in Australia Post code [ ] 2 ○ I live Overseas
39	What is the level highest qualification you have completed?	1 ○ None 2 ○ Primary school 3 ○ Secondary school 4 ○ Tertiary 5 ○ Other, please specify... 6 ○ Not applicable
40	How many years of education have you completed in Australia?	1 ○ None 2 ○ 1 – 5 years 3 ○ 6 – 8 years 4 ○ 9 – 12 years 5 ○ 13 years or more
41	What is your employment status?	1 ○ Employed full-time 2 ○ Employed part-time/casual 3 ○ Unemployed 4 ○ Retired 5 ○ Pensioner 6 ○ Student (not working) 7 ○ Homemaker 8 ○ Other, please specify...

42	What is the total weekly income that your household receives after tax from all sources?	1	○ $1 – 149
		2	○ $150 – 249
		3	○ $250 – 399 (age pension for single)
		4	○ $400 – 599 (age pension for couple)
		5	○ $600 – 799
		6	○ $800 – 999
		7	○ $1000 – 1299
		8	○ $1300 – 1599
		9	○ $1600 – 1999
		10	○ $2000 or more

Thank you very much for participating in this survey. If you have any comments or suggestions, we would love to know. Please write it here.

Hospital: Date:	○ Self completed questionnaire ○ Completed with data collectors assistance ○ Required assistance with English language

Consent Forms

HREC No:
HREC/10/QPCH/98 and 1621AC

Project Title:
Demand for Emergency Health Services in Queensland

Name of Researchers:
Professor Gerry FitzGerald, Dr Sam Toloo, Mrs Joanna Rego

Australian Government
Australian Research Council

Queensland Government
Queensland Health

QUT

Queensland Ambulance Service

Mater
Exceptional People. Exceptional Care.

Townsville Hospital Foundation
...providing the extras that make a difference.

Toowoomba Hospital Foundation

RBWH • Nambour General Hospital • Redland Hospital • Wynnum Hospital • Innisfail Hospital

Participant Consent Form for EDIS Information

In order to have a more complete picture of the demand for emergency health services, we would like to ask your permission to obtain the following information from your (or patient's) hospital records for this visit.

The information is limited to triage category, diagnosis code, discharge status, and times of arrival, triage and discharge. No other information will be collected. This information will be added to your questionnaire information without disclosing your name. If you agree, please tick and sign the section below.

Statement of consent

By signing below, you are indicating that you:

- Consent to the hospital to provide the following information from patient's records to the research project about the current visit:

  ☐ Triage category ☐ Diagnosis code (ICD) ☐ Discharge status code
  ☐ Date & Time of Arrival ☐ Date & Time of Triage ☐ Date & Time of Treatment
  ☐ Date & Time of Departure

- Understand that this information will be added to your questionnaire but your name will be removed.

Patient's Full Name: _____

Date of Birth : D D M M Y Y Y Y

Patient's Signature: _____

Date: D D M M Y Y Y Y

OR IF PATIENT IS UNDER 18 YEARS OLD:

Name of Parent/Carer/ Legally Authorised Person: _____

Signature of Parent/Carer/ Legally Authorised Person: _____

Date: D D M M Y Y Y Y

Participant Consent Form for Focus Group Participation

After this phase of the study, we would like to conduct a few focus groups in the next few months to discuss the research results in more details. If you would like to participate in those focus groups, please provide your contact information in the section below and we will contact you when the focus group studies start. Please be ensured that your details will remain confidential and will not be used for any other purposes and will not be passed on to any other parties.

Statement of consent

By signing below, you are indicating that you:

- agree to be contacted in the future regarding possible participation in the future focus group studies related to this project
- understand that participation is voluntary and you are under no obligation to participate
- understand that your contact details will be remain confidential and will not be used for any other purposes

Name:

_____

Email:

_____

Telephone:

_____

Signature:

_____

Date:

D	D	M	M	Y	Y	Y	Y

Demand for Emergency Health Services in Queensland

PARENT/GUARDIAN QUESTIONNAIRE

1 What is the main problem you have come to the hospital for today?

2 When did this problem start?

1 ○ Today
2 ○ Less than a week ago
3 ○ More than a week ago
4 ○ It is a chronic/ long term condition

3 Where were you when you made the decision to come to hospital about this problem?

1 ○ At home
2 ○ At work
3 ○ In a public place
4 ○ Other, please specify...

4 Were you with somebody when you made the decision to come to hospital about this problem?

1 ○ No, I was by myself
2 ○ Yes, with my family/friends
3 ○ Yes, with my colleagues
4 ○ There were other people and passers-by
5 ○ Other, please specify...

5 How serious did you think the condition was at the time you decided to come to the hospital?

1	2	3	4	5	6	7	8	9	10

Not serious at all — Very serious

6 How serious do you think the condition is now?

1	2	3	4	5	6	7	8	9	10

Not serious at all — Very serious

7 How urgent did you think the condition was at the time you decided to come to the hospital?

1	2	3	4	5	6	7	8	9	10

Not urgent at all — Very urgent

8 How urgent do you think the condition is now?

1	2	3	4	5	6	7	8	9	10

Not urgent at all — Very urgent

9 How much pain do you think the patient felt at the time you decided to come to the hospital?

1	2	3	4	5	6	7	8	9	10

No pain at all — Pain as bad as it gets

10 How much pain do you think the patient feels now?

1	2	3	4	5	6	7	8	9	10

No pain at all — Pain as bad as it gets

11 Does the patient have other conditions for which he/she needs medical care?

1 ○ Yes
2 ○ No

12 Apart from current condition, overall, would you say the patient's health is:

1 ○ Excellent
2 ○ Very good
3 ○ Good
4 ○ Fair
5 ○ Poor

13 Not counting this time, how many times has the patient attended a hospital emergency department during the past six months?

1 ○ 0
2 ○ 1
3 ○ 2
4 ○ 3
5 ○ More than 3, please specify...

14 Considering patient's condition prior to commencement of treatment what priority do you think he/she should be given?

1 ○ Priority 1 (immediately)
2 ○ Priority 2 (within 10 minutes)
3 ○ Priority 3 (within 30 minutes)
4 ○ Priority 4 (within 1 hour)
5 ○ Priority 5 (within 2 hours)
6 ○ Other, please specify...

15 Did you contact anybody about the patient's condition before coming to the hospital? Select all that apply.

1 ☐ No one
2 ☐ The patient's GP
3 ☐ Ambulance
4 ☐ Contacted 13HEALTH
5 ☐ Other, please specify...

16 Who suggested that the patient should come to the hospital? Select all that apply.

1. ☐ No one
2. ☐ The patient suggested
3. ☐ The patient's GP suggested
4. ☐ Ambulance staff suggested
5. ☐ We called 13HEALTH and they suggested
6. ☐ Other family members/ friends suggested
7. ☐ People at work suggested
8. ☐ Others suggested, please specify...

17 Who made the decision to bring the patient to the hospital?

1. ○ It was the patient's decision
2. ○ It was my decision
3. ○ The patient's GP decided
4. ○ Ambulance staff decided
5. ○ We called 13HEALTH and they decided
6. ○ Other family members/friends decided
7. ○ People at work decided
8. ○ Others decided, please specify...

18 Here are some reasons people have mentioned about why they decided to bring the patient to the hospital. Please indicate the extent to which you considered each of these reasons for bringing the patient to the hospital today.

		1 Yes, Considered it to a great extent	2 Considered it to some extent	3 Did not consider it
a	The patient's condition was too severe to go elsewhere.	○ 1	○ 2	○ 3
b	The patient needed immediate (urgent) care.	○ 1	○ 2	○ 3
c	No other health services were available at the time.	○ 1	○ 2	○ 3
d	It's convenient to have all facilities in one place in the hospital.	○ 1	○ 2	○ 3
e	Hospital services are free.	○ 1	○ 2	○ 3
f	Hospital is open at all times.	○ 1	○ 2	○ 3
g	Hospital doctors and nurses are better specialised.	○ 1	○ 2	○ 3

18	1 Yes, Considered it to a great extent	2 Considered it to some extent	3 Did not consider it
h	GPs charge an extra fee.	○ 1	○ 2 ○ 3
i	The hospital is close to where the patient is.	○ 1	○ 2 ○ 3
j	Because the hospital provides better care for the patient's condition.	○ 1	○ 2 ○ 3
k	Other options were not as suitable as the hospital for the patient's problem.	○ 1	○ 2 ○ 3
l	Other reasons, please specify...		

19 Here are a few general statements about hospital emergency departments. We are interested in your opinion about these. Please indicate to what extent you agree or disagree with each statement.

	1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
a	People should go to hospital only if it's urgent or life-threatening.	○ 1	○ 2	○ 3	○ 4 ○ 5
b	The only places available to patients after hours are hospitals.	○ 1	○ 2	○ 3	○ 4 ○ 5
c	Hospitals have the convenience of having all facilities in one place.	○ 1	○ 2	○ 3	○ 4 ○ 5
d	With free services in the hospitals why should patients go elsewhere?	○ 1	○ 2	○ 3	○ 4 ○ 5
e	Hospital doctors and nurses are better specialised.	○ 1	○ 2	○ 3	○ 4 ○ 5
f	If GPs bulk-billed, people wouldn't come to the hospital in the first place.	○ 1	○ 2	○ 3	○ 4 ○ 5
g	People I know have mostly had a good experience with their hospital.	○ 1	○ 2	○ 3	○ 4 ○ 5
h	People wouldn't come to the hospital if they had other practitioners nearby.	○ 1	○ 2	○ 3	○ 4 ○ 5

19	1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
i	Even if you go to a GP or other health services, they refer you to the hospital.	O 1	O 2	O 3	O 4	O 5
j	People can't afford to take time off from work to go to a doctor during the day.	O 1	O 2	O 3	O 4	O 5
k	People would use after hours GP or super clinics even if they didn't bulk-bill.	O 1	O 2	O 3	O 4	O 5
l	It's worth the waiting, even when the hospital is crowded.	O 1	O 2	O 3	O 4	O 5
m	Waiting in the hospital is better than paying an extra fee to the GP.	O 1	O 2	O 3	O 4	O 5
n	Everyone is entitled to free medical services regardless how serious their illness is.	O 1	O 2	O 3	O 4	O 5
o	Coming to the hospital for non-urgent illnesses is a misuse of the health system.	O 1	O 2	O 3	O 4	O 5

In this section we would like to ask a few demographic questions about you. It will help us study a wide range of people from all groups in our society.

20 What's your relation to the patient?

1 O Mother
2 O Father
3 O Grandparent
4 O Legal Guardian
5 O Other, please specify...

21 Are you male or female?

1 O Male
2 O Female

22 What year were you born?

23 In which country were you born?

1 O Australia
2 O Other, please specify...

24	If you were born overseas, in what year did you first arrive in Australia to live here for one year or more?	☐☐☐☐
25	How well do you speak English?	1 ○ English is my native language 2 ○ Almost like a native speaker 3 ○ Communicate without problems 4 ○ With some difficulties 5 ○ With great difficulties 6 ○ I do not speak English
26	Does the patient live with you?	1 ○ Yes 2 ○ No
27	Who else do you live with?	1 ○ No one else 2 ○ With my partner/spouse 3 ○ With my partner/spouse and child/children 4 ○ With my child/children 5 ○ With others, please specify...
28	Is the patient male or female?	1 ○ Male 2 ○ Female
29	What year was the patient born?	☐☐☐☐
30	Apart from Medicare does the patient have any other insurance? Select all that apply.	1 ☐ No 2 ☐ Private insurance 3 ☐ Travel insurance 4 ☐ Veterans Affair 5 ☐ Other 6 ☐ I do not have Medicare
31	In which country was the patient born?	1 ○ Australia 2 ○ Other, please specify...
32	If the patient was born overseas, in what year did he/she first arrive in Australia to live here for one year or more?	☐☐☐☐

33	How well does the patient speak English?	1	○ English is his/her native language
		2	○ Almost like a native speaker
		3	○ Communicate without problems
		4	○ With some difficulties
		5	○ With great difficulties
		6	○ Do not speak English
		7	○ Still an infant. Doesn't speak yet
34	How did the patient arrive at the hospital today?	1	○ By ambulance (road or air)
		2	○ By our own car
		3	○ Police
		4	○ Other family/friend car
		5	○ Taxi
		6	○ Public transport
		7	○ Others, please specify...

If the patient did not arrive by ambulance please go to Question #39.

35	How long did the patient have to wait for the ambulance to arrive after the request was made?	1	○ Less than 10 minutes
		2	○ 11 – 30 minutes
		3	○ 31 minutes to 1 hour
		4	○ More than 1 hour but less than 2 hours
		5	○ More than 2 hours
		6	○ I don't know
36	Who suggested the patient to come by ambulance? Select all that apply.	7	☐ No one
		8	☐ The patient suggested
		9	☐ The patient's GP suggested
		10	☐ We called 13HEALTH and they suggested
		11	☐ Other family/friends suggested
		12	☐ People at work suggested
		13	☐ Others suggested, please specify...

37 Who made the decision for the patient to come by ambulance?

14 ○ It was the patient's decision
15 ○ It was my decision
16 ○ The patient's GP decided
17 ○ We called 13HEALTH and they decided
18 ○ Other family/friends decided
19 ○ People at work decided
20 ○ Others decided, please specify...

38 Here are some reasons people have mentioned about why they made the decision to call the ambulance. Please indicate the extent to which you considered each of these reasons for calling the ambulance today.

		1 Yes, Considered it to a great extent	2 Considered it to some extent	3 Did not consider it
a	Patient's condition was too severe to use other means of transport.	○ 1	○ 2	○ 3
b	We thought the patient would get higher priority in the hospital if arrived by ambulance.	○ 1	○ 2	○ 3
c	There wasn't a car available to drive the patient to the hospital.	○ 1	○ 2	○ 3
d	Nobody was there to drive the patient to the hospital.	○ 1	○ 2	○ 3
e	We couldn't afford to pay a taxi to bring the patient to the hospital.	○ 1	○ 2	○ 3
f	It was safer to come by ambulance.	○ 1	○ 2	○ 3
g	The patient required special care during transport.	○ 1	○ 2	○ 3
h	The patient needed immediate (urgent) care.	○ 1	○ 2	○ 3
i	Because it did not cost us an extra fee to use ambulance.	○ 1	○ 2	○ 3
j	People panicked and called the ambulance.	○ 1	○ 2	○ 3
k	Other options were not as suitable as the ambulance for the patient's problem.	○ 1	○ 2	○ 3
l	Other, please specify...			

Perception of Ambulance Services. Please answer even if the patient did not arrive by ambulance.

39 **Not** counting this time, how many times has the patient used an ambulance during the past six months, including this time?

1 ○ 0
2 ○ 1
3 ○ 2
4 ○ 3
5 ○ More than 3, please specify...

40 Here are a few general statements about ambulance services.
We are interested in your opinion even if the patient did not come by ambulance.
Please indicate to what extent you agree or disagree with each statement.

		1 Strongly Agree	2 Agree	3 Neutral	4 Disagree	5 Strongly Disagree
a	Ambulance is for everyone to use when they feel unwell.	○ 1	○ 2	○ 3	○ 4	○ 5
b	Patients get a higher priority in the hospital if they arrive in an ambulance.	○ 1	○ 2	○ 3	○ 4	○ 5
c	People should be able to use the ambulance if they can't afford a taxi no matter how critical their condition is.	○ 1	○ 2	○ 3	○ 4	○ 5
d	People should use the ambulance if they can't access other means of transport regardless of the seriousness of their condition.	○ 1	○ 2	○ 3	○ 4	○ 5
e	People would still use an ambulance even if they had to pay an extra fee.	○ 1	○ 2	○ 3	○ 4	○ 5
f	People should call the ambulance only if it's an emergency or urgent situation.	○ 1	○ 2	○ 3	○ 4	○ 5
g	Everyone is entitled to free ambulance services regardless how serious their illness is.	○ 1	○ 2	○ 3	○ 4	○ 5
h	Using an ambulance for non-emergency conditions is a misuse of the system.	○ 1	○ 2	○ 3	○ 4	○ 5

41 **Social Support** — Here is a list of some things that other people do for us or give us that may be helpful or supportive. Please read each statement carefully and mark the column that is closest to your situation.

	1 As much as I would like	2 Almost as much as I would like	3 Some, but would like more	4 Less than I would like	5 Much less than I would like
a	I have people who care what happens to me.	○ 1	○ 2	○ 3	○ 4 ○ 5
b	I get love and affection.	○ 1	○ 2	○ 3	○ 4 ○ 5
c	I get chances to talk to someone about problems at work or with my housework.	○ 1	○ 2	○ 3	○ 4 ○ 5
d	I get chances to talk to someone I trust about my personal or family problems.	○ 1	○ 2	○ 3	○ 4 ○ 5
e	I get chances to talk about money matters.	○ 1	○ 2	○ 3	○ 4 ○ 5
f	I get invitations to go out and do things with other people.	○ 1	○ 2	○ 3	○ 4 ○ 5
g	I get useful advice about important things in life.	○ 1	○ 2	○ 3	○ 4 ○ 5
h	I get help when I am sick in bed.	○ 1	○ 2	○ 3	○ 4 ○ 5

42 Please indicate how you feel about each of the following statements.

	1 Not true at all	2 Hardly true	3 Moderately true	4 Exactly true
a	I can always manage to solve difficult problems if I try hard enough.	○ 1	○ 2	○ 3 ○ 4
b	If someone opposes me, I can find the means and ways to get what I want.	○ 1	○ 2	○ 3 ○ 4
c	It is easy for me to stick to my aims and accomplish my goals.	○ 1	○ 2	○ 3 ○ 4

42	1 Not true at all 2 Hardly true 3 Moderately true 4 Exactly true				
d	I am confident that I could deal efficiently with unexpected events.	○ 1	○ 2	○ 3	○ 4
e	I can solve most problems if I invest the necessary effort.	○ 1	○ 2	○ 3	○ 4
f	If I am in trouble, I can usually think of a solution.	○ 1	○ 2	○ 3	○ 4
g	I can usually handle whatever comes my way.	○ 1	○ 2	○ 3	○ 4

The information in this section will help us understand the views of different groups. Your information will remain confidential and will not be disclosed to anyone outside the research team.

43 What is your present marital status?

1 ○ Married
2 ○ Never married
3 ○ Widowed
4 ○ Divorced
5 ○ Separated but not divorced
6 ○ De facto relationship
7 ○ Not applicable

44 Are you of Aboriginal or Torres Strait Islander origin?

1 ○ No
2 ○ Yes, Aboriginal
3 ○ Yes, Torres Strait Islander
4 ○ Yes, both Aboriginal and Torres Strait Islander

45 Where do you usually live?

1 ○ I live in Australia
Post code [ ]
2 ○ I live Overseas

46 What is the level highest qualification you have completed?

1 ○ None
2 ○ Primary school
3 ○ Secondary school
4 ○ Tertiary
5 ○ Other, please specify...

6 ○ Not applicable

47	How many years of education have you completed in Australia?	1 ○ None 2 ○ 1 – 5 years 3 ○ 6 – 8 years 4 ○ 9 – 12 years 5 ○ 13 years or more
48	What is your employment status?	1 ○ Employed full-time 2 ○ Employed part-time/casual 3 ○ Unemployed 4 ○ Retired 5 ○ Pensioner 6 ○ Student (not working) 7 ○ Homemaker 8 ○ Other, please specify...
49	What is the total weekly income that your household receives after tax from all sources?	1 ○ $1 – 149 2 ○ $150 – 249 3 ○ $250 – 399 (age pension for single) 4 ○ $400 – 599 (age pension for couple) 5 ○ $600 – 799 6 ○ $800 – 999 7 ○ $1000 – 1299 8 ○ $1300 – 1599 9 ○ $1600 – 1999 10 ○ $2000 or more

Thank you very much for participating in this survey. If you have any comments or suggestions, we would love to know. Please write it here.

Hospital: Date:	○ Self completed questionnaire ○ Completed with data collectors assistance ○ Required assistance with English language

Consent Forms

HREC No:
HREC/10/QPCH/98 and 1621AC

Project Title:
Demand for Emergency Health Services in Queensland

Name of Researchers:
Professor Gerry FitzGerald, Dr Sam Toloo, Mrs Joanna Rego

Australian Government
Australian Research Council

Queensland Government
Queensland Health

QUT

Queensland Ambulance Service

Mater
Exceptional People. Exceptional Care.

Townsville Hospital Foundation
...providing the extras that make a difference.

Toowoomba Hospital Foundation

RBWH • Nambour General Hospital • Redland Hospital • Wynnum Hospital • Innisfail Hospital

Parents/Guardian Consent Form for EDIS Information

In order to have a more complete picture of the demand for emergency health services, we would like to ask your permission to obtain the following information from the patient's hospital records for this visit.

The information is limited to triage category, diagnosis code, discharge status, and times of arrival, triage and discharge. No other information will be collected. This information will be added to your questionnaire information without disclosing patient's name. If you agree, please tick and sign the section below.

Statement of consent

By signing below, you are indicating that you:

- Consent to the hospital to provide the following information from patient's records to the research project about the current visit:

  ☐ Triage category ☐ Diagnosis code (ICD) ☐ Discharge status code
  ☐ Date & Time of Arrival ☐ Date & Time of Triage ☐ Date & Time of Treatment
  ☐ Date & Time of Departure

- Understand that this information will be added to your questionnaire but your name will be removed.

Patient's Full Name: _____

Date of Birth : D D M M Y Y Y Y

Name of Parent/Carer/ Legally Authorised Person: _____

Signature of Parent/Carer/ Legally Authorised Person: _____

Date: D D M M Y Y Y Y

Parents/Guardian Consent Form for Focus Group Participation

After this phase of the study, we would like to conduct a few focus groups in the next few months to discuss the research results in more details. If you would like to participate in those focus groups, please provide your contact information in the section below and we will contact you when the focus group studies start. Please be ensured that your details will remain confidential and will not be used for any other purposes and will not be passed on to any other parties.

Statement of consent

By signing below, you are indicating that you:

- agree to be contacted in the future regarding possible participation in the future focus group studies related to this project
- understand that participation is voluntary and you are under no obligation to participate
- understand that your contact details will be remain confidential and will not be used for any other purposes

Name:

Email:

Telephone:

Signature:

Date:

D	D	M	M	Y	Y	Y	Y